

# RAILROAD GAZETTE

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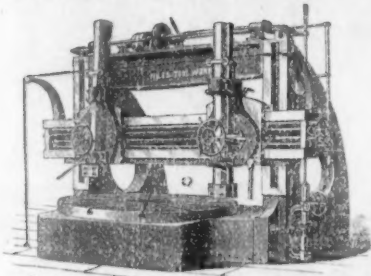
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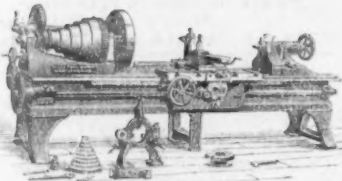
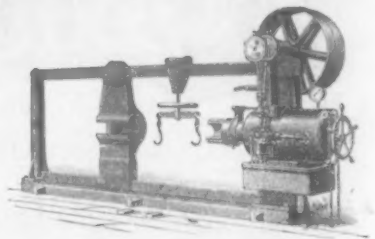
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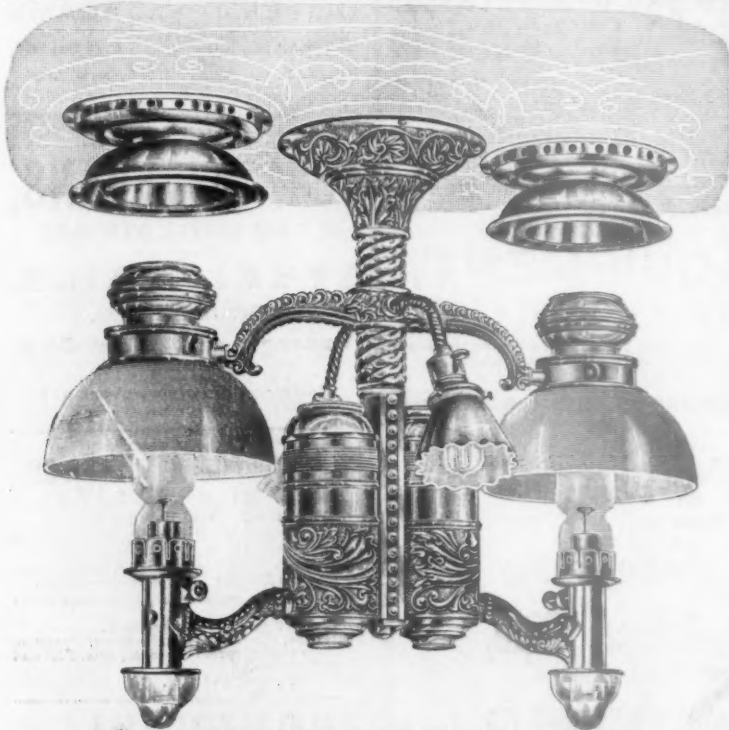
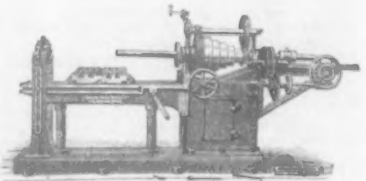
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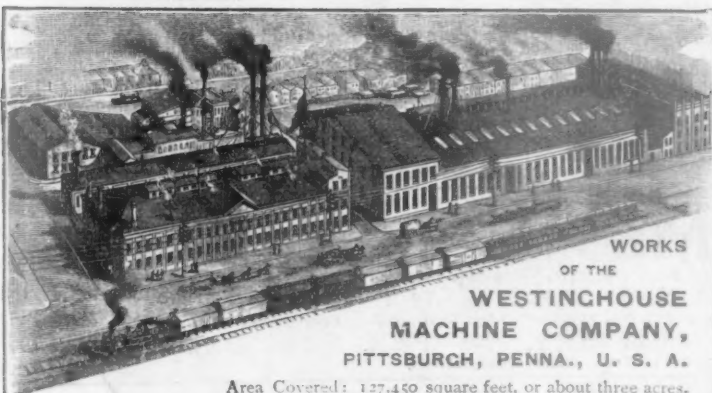
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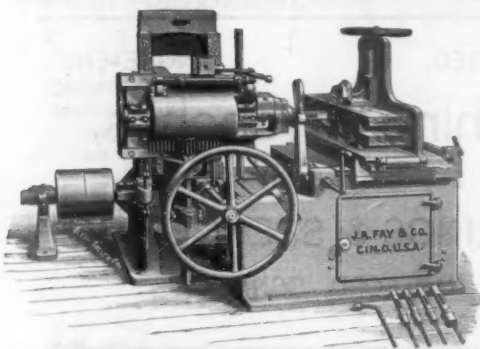
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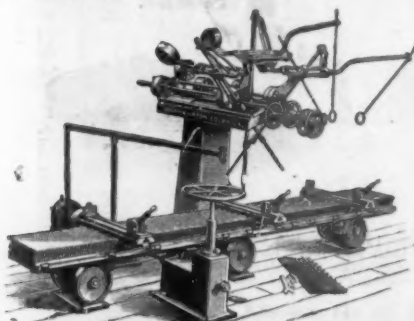
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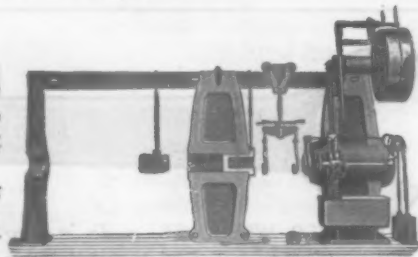
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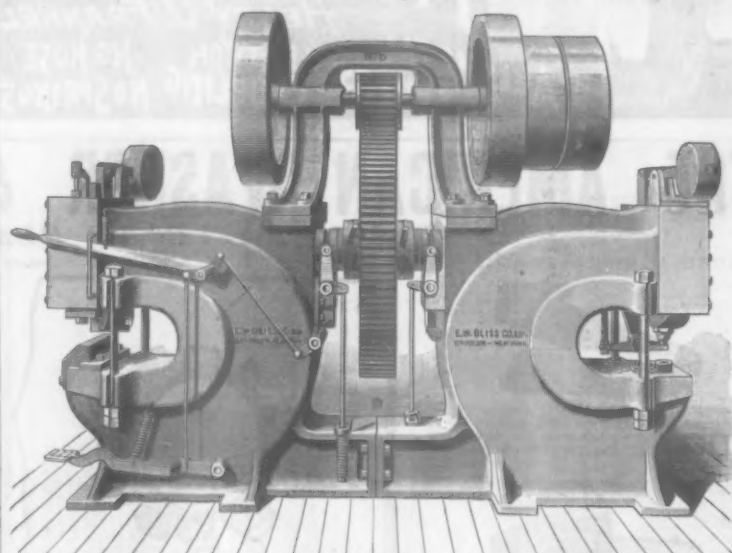
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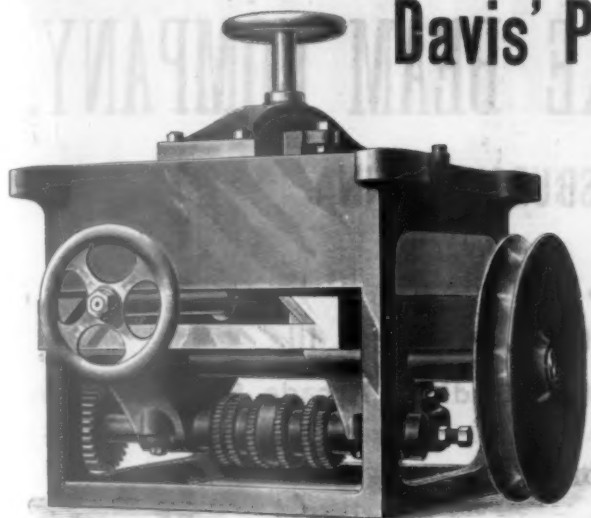
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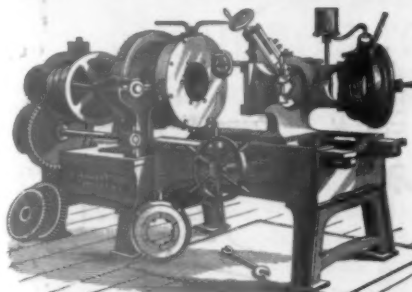
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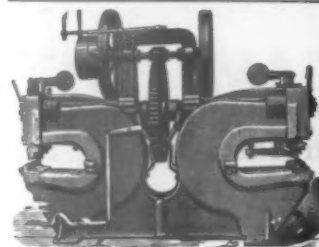
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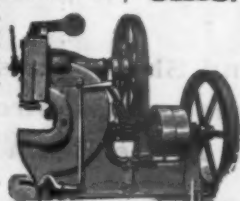
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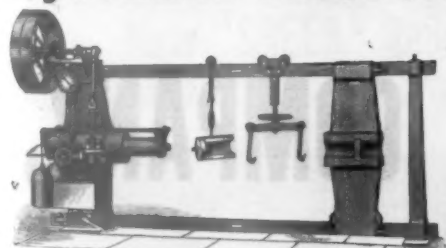
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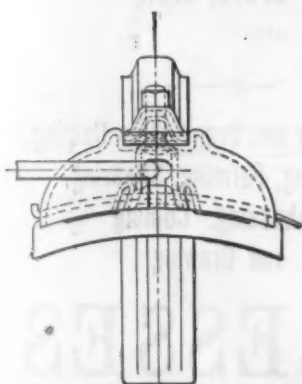
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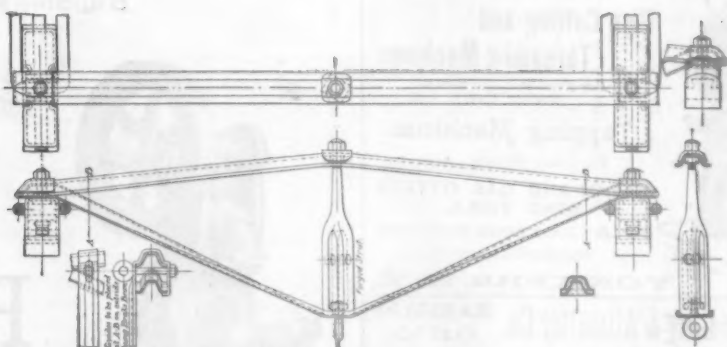
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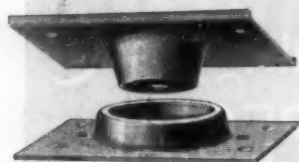
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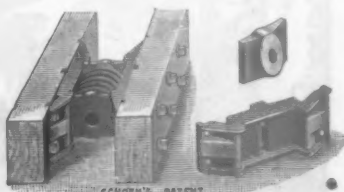
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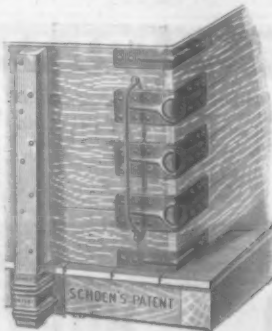
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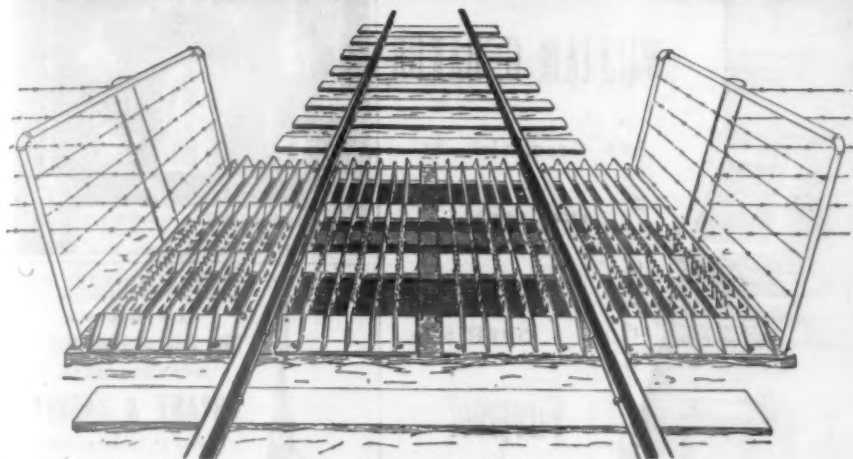
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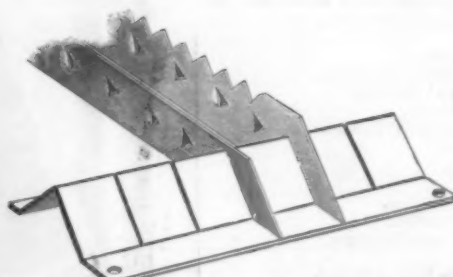


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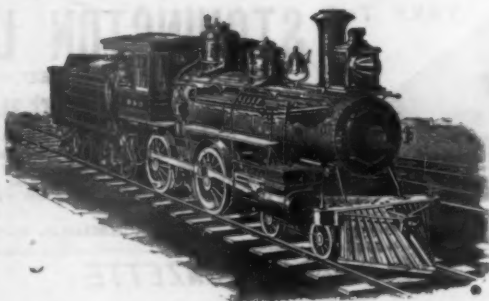
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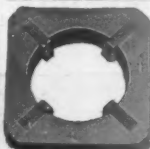

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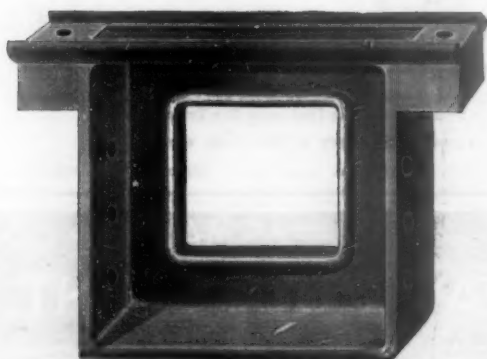
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## BURNAM, WILLIAMS & CO., Proprietors,

### PHILADELPHIA, PA.,

Invite the attention of railway managers and users of locomotives to the advantages of the four-cylinder type of compound locomotives, invented by Samuel M. Vauclain. These locomotives have now been constructed in such numbers, and have been so thoroughly tested on different railways, that they may be considered to have passed the experimental stage. More than 100 are now in service upon the principal railways of the United States of Brazil and other foreign countries, whilst nearly 100 more are under construction. The results obtained have in numerous instances led to repeated orders from the same companies. The following advantages may be expected from their use, and will be guaranteed when required:

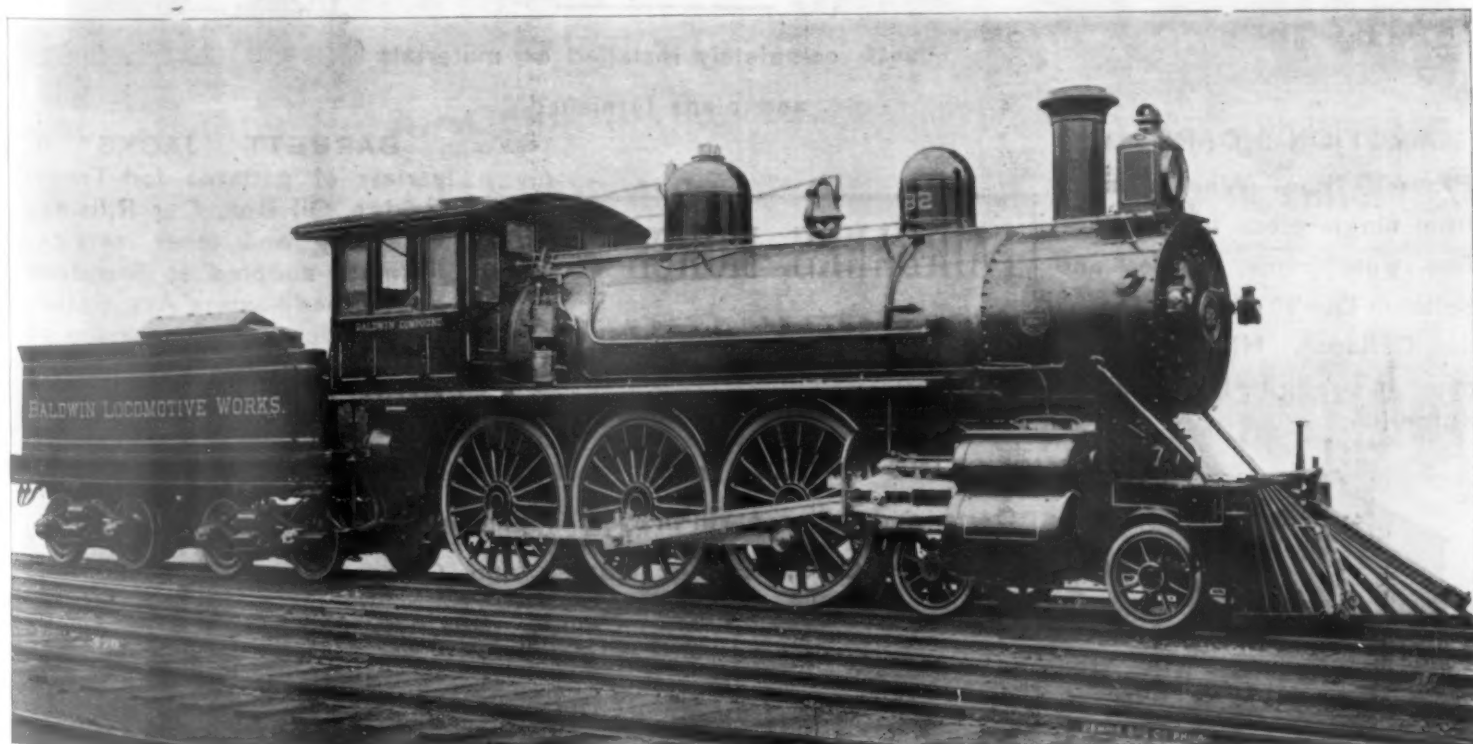
An economy of fuel, varying with the conditions of service, but usually from twenty to thirty-five per cent. in freight service, and from fifteen to twenty-five per cent. in passenger service.

An economy of water, of from ten to twenty per cent., according to the service. Compound locomotives can therefore travel further without stopping for water, or need haul a less weight of water for a given distance. The deposit of scale or sediment in the boiler is consequently less for equal service.

Less throwing of sparks. The low pressure at which the steam escapes from the exhaust gives so soft a blast that the tendency to draw unconsumed fuel through the tubes is largely reduced. A large reduction in the amount of fire claims may be expected to follow the general use of compound locomotives.

Less noise. The escape of steam at low pressure largely reduces the noise of the exhaust. This is an advantage which is of the utmost importance for elevated railways and suburban and switching service in cities. The more perfect combustion also diminishes the emission of black smoke.

These advantages are obtained without a considerable increase in the number of parts, without considerable interference with interchangeability with similar single-expansion engines, and with little or no increase in the cost of maintenance.



TEN-WHEEL COMPOUND LOCOMOTIVE BUILT FOR TESTS BY THE MASTER MECHANICS' ASSOCIATION  
COMMITTEE ON COMPOUND LOCOMOTIVES.

# Richmond and West Point Terminal Railway and Warehouse Company.

NEW YORK, MARCH 17, 1892.

**TO THE HOLDERS OF SECURITIES OF THE RICHMOND AND WEST POINT TERMINAL RAILWAY AND WAREHOUSE COMPANY AND OF ITS AUXILIARY CORPORATIONS:**

The committee appointed on behalf of the stockholders of the **TERMINAL COMPANY** submits for your approval a plan of reorganization, dated March 1, which is lodged with the **CENTRAL TRUST COMPANY** of New York. Under this plan the following new securities of a consolidated corporation are to be issued:

## SECURITIES TO BE ISSUED.

Four Per Cent. 35-Year Gold Bonds, to be Secured by First Mortgage on all the Property and Equipment of a New Company, Interest Payable Quarterly.....	\$170,000,000
Five Per Cent. Preferred Stock (Non-Cumulative), vote of Majority of Preferred Stock Required to Authorize any Additional Mortgage on Property Covered by First Mortgage.....	70,000,000
Common Capital Stock.....	110,000,000
<b>Total.....</b>	<b>\$350,000,000</b>

Holders of securities of the **RICHMOND TERMINAL COMPANY**, the **RICHMOND AND DANVILLE RAILROAD COMPANY**, and the **EAST TENNESSEE, VIRGINIA AND GEORGIA RAILWAY COMPANY**, and their allied corporations are invited to deposit the same with the **CENTRAL TRUST COMPANY** (against its negotiable receipts, which are to be listed on the Stock Exchange) and to become parties to the plan.

The method of exchange and of distribution of the new securities is set forth in detail in the **Plan of Reorganization**.

Holders of **Richmond Terminal Preferred** and **Common Stock** and **Richmond Terminal Five Per Cent. Collateral Trust Bonds** are invited to subscribe to the cash fund of \$14,588,640, which is to be applied to meet the cash requirements of the plan, upon the following terms:

Each holder of 100 shares of said **Common** or **Preferred Stock**, and each holder of ten one thousand-dollar **Five Per Cent. Collateral Trust Bonds** is entitled to subscribe for \$1,600 of said fund. For each \$1,600 of such cash subscription the subscriber is to receive \$2,000 of the new **Fours**, and \$700 of the new **Preferred Stock**.

Holders of lesser amounts than 100 shares or ten thousand dollars of bonds may subscribe and become entitled to new securities in the same proportion.

Subscribers must sign and deliver to the **CENTRAL TRUST COMPANY** a form of acceptance of right to subscribe, which will be furnished by the Trust Company.

All subscriptions must be made on or before the 14th day of April, 1892, and at the time of making such subscription the holder of the bonds or stock on which the subscription is made must deposit the same with the **Central Trust Company** and become a party to the **Plan of Reorganization**. The names of the subscribers will be registered by the **Central Trust Company**, and the right to the subscription shall belong to the registered subscriber and shall not follow a sale of the bond or of the stock or of the receipts representing the same. If on the 14th day of April, 1892, any portion of said cash fund shall remain unsubscribed, the Committee charged with the execution of this plan will offer to the registered subscribers the right to subscribe to the unsubscribed balance of the said fund upon such terms as the Committee may fix. The right to make such additional subscription must be exercised on or before April 25, 1892.

The allotment of subscriptions shall be made by the Committee at the expiration of the period last referred to, the Committee reserving the right to allot from any unsubscribed balance of said fund an amount less than the amount of the additional subscription.

Holders of said **Five Per Cent. Collateral Trust Bonds** and of the **Preferred** and **Common Stock** may deposit their securities with said depository, and become parties to the reorganization plan, without subscribing to the \$14,588,640 cash fund, if they shall elect to do so.

A bankers' syndicate has been formed which has guaranteed the entire subscription.

When in the judgment of the Committee sufficient securities have been deposited, the Committee will announce by advertisement that the plan has become effective.

Moneys arising from the subscription shall not be used by the Committee until such announcement shall have been made.

Copies of the **Plan of Reorganization** and forms of acceptance and assignment of right to subscribe may be obtained at the **CENTRAL TRUST COMPANY**, 54 Wall Street.

Deposits of securities under the plan must be made on or before April 14th, 1892, unless the Committee shall extend the time therefor.

Application will immediately be made to list the reorganization certificates of deposit on the **Stock Exchange**.

NEW YORK, March 17, 1892.

FREDERIC P. OLCOTT,

Chairman,

OLIVER W. PAYNE,

FREDERICK D. TAPPEN,

WILLIAM H. PERKINS,

HENRY HUDGE,

H. C. FAHNESTOCK,

J. KENNEDY TOD,

Committee.

GEORGE S. ELLIS, Secretary, 54 Wall Street, New York.



**SECTION CARS** with Pressed Steel Wheels, made from single-piece tough plate, free from joints, angles and bolts. Don't Warp, Shrink nor Collapse. Highest attainment in strength, light weight, durability.



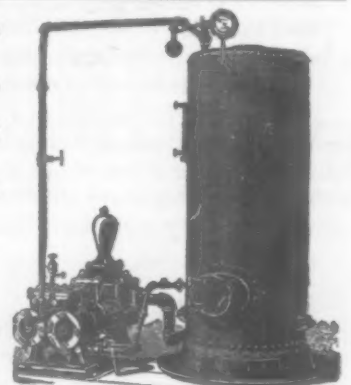
**WATER TANKS, Fixtures, Automatic Stand-Pipes, Steam Pumps, Boilers, Valves, Pipe and everything appertaining to Water Supply for Railroad Stations, Roundhouses and Stock Yards.**

Plants completely installed or materials and plans furnished.

**FAIRBANKS, MORSE & CO.,**  
CHICAGO.

**WRECKING FROGS, Track Tools, Scrapers, Dump Cars, Carts and other earth-moving implements; Push Cars, Raillayers' Cars; Single, Duplex and Compound Pumps, Windmills and Force Pumps, Engines and Boilers.**

Request Catalogue of Above and Kindred Supplies for Railroad Purposes,



**BARRETT JACKS** in variety of patterns for Track, Bridge, Oil Box, Car Raising, Wrecking and other service. Formally adopted as Standard by the Roadmasters' Association of America, in late session at Minneapolis. Other Jacks have merit; none but the Barrett combines desirable features.





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Corner Church and Hector Streets.

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L. M. SLACK,

411 Phenix Building.

## CRANES,

## WRECKING CARS,

## STEAM SHOVELS,

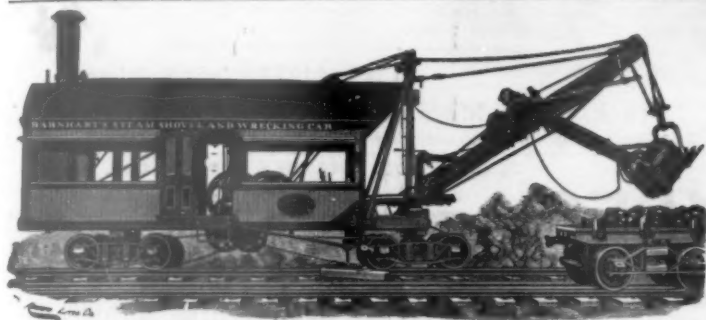
## PILE DRIVERS,

## RAIL SAWS,

## TURN-TABLES,

## TRANSFER TABLES,

## FREIGHT CONVEYORS.



One and One-half Yard Shovel.

## MARION STEAM SHOVEL COMPANY

MANUFACTURERS OF

BARNHARDT'S PATENT STEAM SHOVELS, WRECKING CARS AND DREDGES  
RAILROAD DITCHERS AND BALLAST UNLOADERS.

All of our machines guaranteed to give entire satisfaction, otherwise money may be returned at our expense.  
For further information, photographs, catalogs and discounts address

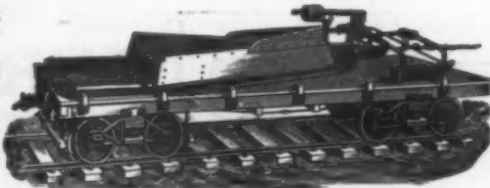
Marion Steam Shovel Co.

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MARION, O.

San Francisco Office:

Geo. W. Barnhardt, 4 Sutter St.



Barnhardt's Patent Ballast Unloader.

## JOHN SOUTHER & CO., BOSTON, MASS

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## Patent Steam Excavators,

WITH CHAPMAN'S IMPROVEMENTS AND DREDGES.

## DREDGES & SHOVELS

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STEAM SHOVELS.

—FOR ALL PURPOSES.—

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No. 1.—Weight, 40 tons. Capacity 6 cubic yards per minute.



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Aside from our Standards (Nos. 1 and 2) we build machines of special design, or from any drawings furnished.

## THE UNIVERSAL RADIAL DRILL CO., CINCINNATI, O.,

Manufacturers Exclusively of

"Universal" and "Radial"

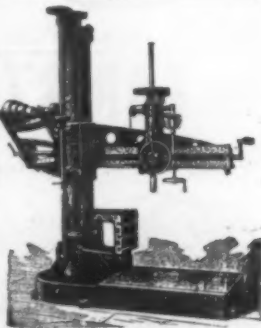
DRILLING

MACHINES,

to Standard Gauges.

Prices upon application.

Correspondence solicited.



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FOR

TUNNELS, QUARRIES, MINES, RAILROADS,

And Wherever Ore and Rock are to be drilled and blasted.

## RAND DRILL CO.,

23 Park Place, - - - NEW YORK.



## THE NEW HIGH EXPLOSIVE

## RACKAROCK

Furnished in two ingredients which are absolutely unexplosive until combined by the consumers, for which we furnish convenient means. Shipped and stored as ordinary merchandise. After combination the explosive is absolutely safe. By reason of its safety it is especially adapted to water-works construction in crowded streets.

## Rendrock Powder Co.

23 PARK PLACE, NEW YORK



## Car Pile Drivers.

SEND FOR CATALOGUE.

VULCAN IRON WORKS,

CHICAGO.



## SPECIAL NOTICE.

Two handsome photo-engraved display sheets entitled:

"Recent Improvements in Air Compressors."

"Recent Improvements in Rock Drills."

Mailed free to any one who will cut out this advertisement and mail it to us with his name and address.



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# ILLINOIS STEEL COMPANY

Manufacturers of Bessemer Foundry and Mill Pig Iron, Spiegel and Ferro-Manganese; Iron and Steel Merchant Bar; Nails and Rail Fastenings; Light "T" and Street Rails; Steel Blooms, Slabs, Billets and Wire Rods of any required chemical composition; Iron or Steel Car Truck Channels; Steel "I" Beams and Structural Shapes. Rolls for Standard Sections and Shapes always in stock. Special Sections and Shapes made to order.

## BESSEMER STEEL RAILS

FROM 8 TO 100 LBS. PER YARD.

This Company owns and operates five works, namely: NORTH WORKS and UNION WORKS, Chicago; SOUTH WORKS, South Chicago; JOLIET WORKS; MILWAUKEE WORKS.  
 JULIAN L. YALE, General Sales Agent, General Offices, "Rookery," Chicago, Ill. Milwaukee (Wis.) Office, 151 N. W. Ins. Building. New York Offices, 46 Wall Street. D. E. GARRISON & CO., Agents, St. Louis, Mo.

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## IRON AND STEEL SPLICE BARS.

Track Bolts, Merchant Iron and Bar Steel. The largest capacity and best facilities in the United States for making Angle Splice Bars.

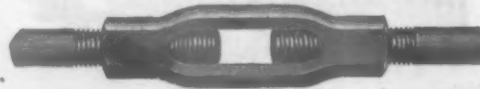
WROUGHT-IRON OPEN HEXAGONAL.

MADE FROM THE BEST CHARCOAL IRON.



## TURNBUCKLES.

Guaranteed Stronger than any Similar Article on the Market.



Eastern Agents:  
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The Only Buckle Made that has  
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HEAVY RAILS, LIGHT RAILS AND RAIL FASTENINGS  
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 The First to Make Boiler Plates in America.  
 STEEL AND IRON PLATES.  
 Firebox Steel Plates a Specialty. We Can Roll Steel Circles 116 in. Diameter  
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This represents a piece of  
 Lukens' Boiler Steel 1/2 in.  
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HALF SIZE.

This represents the same  
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 point, showing a reduction  
 of area of 45 percent, and  
 an elongation in 2 in. of 45  
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We flange heads and flue  
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Make a Specialty of

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 RAILROAD TRACK TOOLS.

ALSO SOLE MANUFACTURERS OF  
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SEND FOR OUR NEW CATALOGUE.

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Cast Steel, Spring Steel, all sizes and grades. Railroad Spring Steel a specialty.

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## Passenger Car Ventilator.

ALL CINDERS, DUST AND DIRT EXCLUDED.

A SUPPLY OF FRESH AIR GIVEN.

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FOR  
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## Automatic Highway Crossing Alarm

is in use on the New York, Chicago & St. Louis; New York, Lake Erie & Western; New York, Pennsylvania & Ohio; Chicago & Erie; Lake Shore & Michigan Southern; Chicago & Grand Trunk; Flint & Pere Marquette; New York, Susquehanna & Western; Colorado Midland; Toledo, Ann Arbor & North Michigan; Cincinnati, Jackson & Mackinaw; Baltimore & Ohio Southwestern; Pittsburgh & Western; New York & New England; Cincinnati, New Orleans & Texas Pacific, and other railroads.

Suitable for All Locations, Either Double or Single Track.

## ELECTRIC SUPPLY & MFG. CO.

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Diameter  
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W. S. GILMORE, Treasurer.

MELVILLE P. HALL, Secretary.

S. MARSH YOUNG, General Agent.

C. W. BREWSTER, Sales Agent.

HENRY BEZER, Mechanical Signal Engineer.

A. J. WILSON, Sup't Electrical Construction.

# The Hall Signal Co.

## PROGRESS:

January 1, 1890, in operation on - - - - - TWO ROADS.

March 1, 1892, in operation and process of erection on TWENTY-FIVE ROADS.

### WIRE CIRCUIT AND RAIL CIRCUIT

## AUTOMATIC ELECTRIC SIGNALS.

*We have added to our Automatic Electric Signal Systems*

## Mechanical and Auto-Manual Block Signaling

IN ALL ITS BRANCHES,

Having obtained control of the BEZER LOCK AND BLOCK SYSTEM, BEZER AND BURLEY INTER-LOCKING MACHINES, besides the best known forms of Semaphores, Compensator, Selector, etc.

Our new Lock and Block System was devised by Mr. Bezer (who originally came to this country as the representative of the Sykes Lock and Block System) from a full knowledge of the shortcomings of other Lock and Block Systems, and in combination with the Hall Track Instrument, for its automatic locking feature, renders this the most perfect Operator System ever devised.

The Bezer and Burley Interlocking Machine possesses most important improvements in actuating mechanism, and is the only machine in which MITRE locking with a HORIZONTAL TAPPET can be satisfactorily and successfully used.

The reputation of this Company for perfection of workmanship, and our guarantee of efficiency will assure satisfaction in the field of mechanical work.

## THE HALL SIGNAL COMPANY,

50 BROADWAY,  
NEW YORK.

340 THE ROOKERY,  
CHICAGO.

Please Note Announcement on Next Page.

# A SIGNAL SUCCESS.

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**OUR SYSTEMS** of automatic electric block signals (on wire and rail circuits) are working with great satisfaction to the railroad companies using them, and in almost every case their use is being extended.

Our new rail-circuit systems are showing unparalleled results. Eleven of these signals, on a certain road, have been operating over seven months with a record of but four train stops (caused otherwise than by trains in block and open switches), and these were due to signals being struck by lightning, one broken battery jar and to one broken rail. They have also operated with **ABSOLUTE RELIABILITY**. From the reports of railroad companies using other rail-circuit signals, we are justified in claiming that no such good results (or records) have ever before been shown.

Having substantiated our claims to the complete satisfaction of many leading railroad officials, we are now engaged in applying the systems on several new lines, and we are also engaged in preparing **PLANS AND ESTIMATES FOR THE APPLICATION OF THE SIGNALS FOR MANY OTHER COMPANIES**, several of whom do not consider any other signal than

## THE HALL.

We pride ourselves on the excellent and honest character of our work, and beg to assure all who deal with us that they will be fairly and squarely treated, and always with the assurance of satisfaction. All correspondence that may be addressed to our New York or Chicago office will receive careful and immediate attention, and any inquiries on any subject relating to our specialties will command the professional knowledge and skill of our engineering department.

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## THE HALL SIGNAL COMPANY,

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340 The Rookery, Chicago.

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S. MARSH YOUNG, General Agent.  
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# THE KINSMAN BLOCK SYSTEM COMPANY,

## CENTRAL BUILDING,

LIBERTY STREET, NEW YORK.

[Definite Announcements will be made in this space in succeeding issues.]

### NEW YORK BELTING & PACKING CO

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15 PARK ROW, NEW YORK.

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Oldest and Largest Mfrs. in the U. S. of

### VULCANIZED RUBBER FABRICS

For Mechanical Purposes.

RUBBER BELTING AND PACKING.

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For Tapping and Reaming Stay Bolt Holes in Boilers.

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STOW MFG. CO., Binghamton, N. Y.  
Inventors and Manufacturers of the Stow Flexible Shaft for all purposes.

Stow Flexible Shaft Co., Limited,

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### FLEXIBLE SHAFTS,

And all kinds of Machines to be used with them. Portable Drilling, Tapping, Reaming and Boring Machines. Also Portable tools for emery wheel grinding, metal and wood polishing, cat-lebrishing and clipping, etc.

Builders of Special Machines for railroads, Bridge and Boiler Makers, Contractors, etc.

### HOISTING ENGINES.

Of any Power and Style, SINGLE AND DOUBLE CYLINDER, with improved patent friction drums especially adapted for all classes of work. Single and Double Drum, friction and direct geared, link motion MINING Engines. Four, six and eight spool, lock clutch, self-propelling BRIDGE ERECTING Engines. Double cylinder, double friction drum. DUCK BUILDING and FILE DRIVING Engines. Quick motion, friction geared COAL HOISTING Engines. Powerful compound geared and friction geared QUARRY Engines. WITH OR WITHOUT BOILERS. Any amount of reference given. Established 1870.

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SPECIALTY: RAILWAY and LOCOMOTIVE WORK.

Marine and land engine tests made at short notice. Recent and scientific methods used in all work.

The completion of inventions to practical application, including specifications and estimates, forwarded by new methods.

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CHEAPEST, MOST DURABLE,

MOST POWERFUL. HAVE STOOD THE TEST OF EIGHT YEARS.

OUR PATENTS:—Damper Regulators, Pressure Regulators for Steam and Water; Return Traps, Separators, Balanced Steam Traps, Damper Regulators for Hot Water Heating; other Steam Specialties.

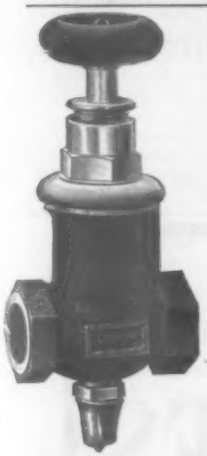
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The CURTIS REGULATOR CO.

63 BEVERLY ST., BOSTON, MASS.



THE CURTIS STEAM PRESSURE REGULATOR.

### ROYAL (FIRE)

INSURANCE COMPANY  
Of Liverpool, England.

ESTABLISHED 1845.

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E. F. BEDDALL, Manager.  
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Important to Railroad Managers and Master Mechanics.

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PERFECTION VALVE OIL.

More perfect lubrication insured, and entire freedom guaranteed from corrosion of cylinders and destruction of steam joints by fatty acids. In exclusive use on 50 railroads. References and prices furnished upon application.

Make exclusive specialty of the Manufacture of Valve and Signal Oil for Railroad use.

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(Limited),

FRANKLIN, PA.

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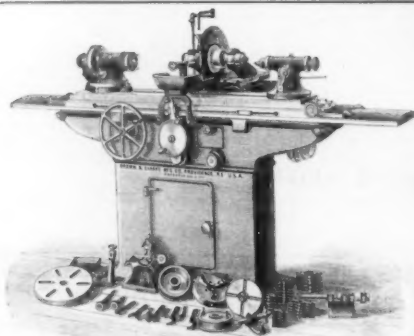
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FRIDAY, MARCH 25.

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Contributions.

Firebox Above the Frames.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There was built in the shops of the Reading Railroad by James Millholland, Master Machinist, a passenger engine called the "Vera Cruz" with the firebox on the top of the frame and underhung springs, which was first run in August, 1857. This engine was allowed to run for some time to prove the new design; that is, with the firebox on top of the frame and underhung springs, and then was commenced the construction of two more passenger engines, one of them named the "Minnehaha" and the other the "Hiawatha." These engines were turned out of the shop in June, 1859. I, therefore, am inclined to think that these were the first engines that were ever built in this country with the fireboxes on the top of frames, and I think that as a matter of history James Millholland should have the credit of the design. It is needless for me to say to you that hundreds of engines have been built since with similar fireboxes.

SUPT. OF MOTIVE POWER.

[We said recently that the first instance of the firebox being placed on top of the frame was on three engines on the Reading road; namely, the "Vera Cruz," "Minnehaha," and "Hiawatha." There was a fourth engine built at about that time named the "Kosciusko" which had the firebox in the same position. In addition to having the fireboxes on top of the frames, they also had the springs under the axle boxes, an arrangement which Mr. Millholland used on all passenger engines from that date until he left the Reading. The Baldwin Locomotive Works were the next to place the fireboxes and springs in this way. The arrangement was copied from Mr. Millholland's engines.—EDITOR RAILROAD GAZETTE.]

The Seven Proposed Railroads in London.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In view of the fact that at least five of the seven new railroads across London are proposed to be worked by electricity, and perhaps also of the fact that, like the South London Subway, they are, in a great measure, to be all deeply buried beneath the surface, it now appears that some public interest is being manifested in the matter. A joint committee of the Houses of Parliament is to be moved for to specially inquire into all the proposed electric and cable schemes asked to be sanctioned this session. The committee is to be asked to report its opinion, as to whether underground railroads, worked by electric or cable traction, are calculated to afford sufficient accommodation for the present and probable future traffic, whether any of the schemes propose satisfactory lines of route and should be proceeded with during the current session. It seems probable, therefore, that there will be a more or less satisfactory selection, and truly one is needed.

In plan there is very little appearance of joint deliberation among the promoters of the new schemes. There is no apparent concert; no attempt at building any short portions of what in time may readily be extended to form a part of one harmonious system; but each little band of promoters imagining itself the centre of the universe, lays down its little bit of line with no consideration whatever for the future. They would treat the yet practically untouched subsoil just as equally careless predecessors have treated the upper soil in London, and practically deprived the city of rapid transit.

The figure set down for construction of several of the

new lines comes curiously near \$1,000,000 per mile, a rather heavy item considering the loudly proclaimed simplicity of tunneling in the London clay by the Great-head system, and one which offers a poor prospect of dividend to any but preference shareholders and debentures like the equally costly predecessor to Stockwell.

How the levels of the various lines compare would be an interesting subject to investigate, and one which the advisers to the joint committee should take good care to ascertain, or future subsoil lines will require to be laid down like so many switchback railroads to alternately pass under and over older lines which have been laid 20, 30 or 40 ft. out of proper place vertically. To thoroughly thrash out a good scheme will be no easy matter, but it ought to be done before another foot of deeply buried railroad is allowed to be constructed.

Americans who see such enormous constructional costs will be wise in keeping such a system at a distance until they learn whether or not the cost set down in capital is actual or watered. Seven hundred and thirteen thousand dollars per mile of small double tunnel in two tubes, which is the estimate for the tunneling alone of one line, is rather a heavy order. If genuine then rapid transit cannot be made to pay on such terms. Yet such is the persuasive power of promoters that, in face of the financial failure of the existing subway, many investors will be forthcoming to back up the new ventures.

M. AM. SOC. C. E.

Coupler Legislation.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There seems to be considerable confusion and lack of judgment as to what ground a coupler law should cover, and a misconception of what is necessary in an M. C. B. coupler to make it safe. There is also a disposition to listen to the interested statements of the switchmen and trainmen who wish the so-called "automatic" link-and-pin coupler to be adopted, so that their occupation as skilled men in the art of coupling may not be taken away. They have some reason, however, to complain about coupling the M. C. B. type to the old, or link-and-pin system, which will gradually grow less as the M. C. B. are applied in greater numbers.

The principal point taken in all the discussions, also in all the laws already passed by the state legislatures, and the bills just introduced into Congress is to eliminate or avoid the necessity for the men going between the cars at all. This is an impossibility with any coupler of the link-and-pin type. In the first place it is impossible to make a link-and-pin coupler couple automatically under all circumstances, the difference in the height of cars, and the fact that often a link will be in both cars that are approaching each other, and at times none at all, making it necessary in the first place to go in between to take one out, in the second place to put one in, this (whether they are supposed to be automatic or not) would always be the case, so that it would be impossible to carry out the letter or spirit of the law with this type.

It is not likely the managers of the railroads of the country would go to the expense of applying the M. C. B. to as many cars as they have already, which cost two to three times as much as the link-and-pin, if they did not realize it would eventually overcome the danger to which their men are now subjected, and relieve them from suits for damages to which they might be liable. With this view of the case is it not much better to go on with the M. C. B. type and pass a law which will be equitable and just to both the trainmen and their employers?

It is said that the M. C. B. type is not strictly automatic either, but this is not so unless both of the knuckles are closed; also that it is more dangerous to couple it to the old system than it is to couple two of the link-and-pin together. While this is a fact, if you take into consideration the number of cars that are annually being built to which the M. C. B. are applied, many of them being run in solid trains in connection with the air brakes, and many of them being coupled together in the ordinary trains, it will be seen that in proportion to the number of cars that are added, which would have been link-and-pin the danger will diminish. The number of trains is increasing, also the number of men employed to handle them; this, too, will account for the increase in accidents.

It is also necessary with the M. C. B. couplers most generally in use to go between the cars to open one knuckle when two of them are approaching each other and both of them are closed, and is the only occasion the brakeman have to go between the cars with this type when coupling to itself, and as the number increase the occasion even for this will grow less very fast, because one knuckle is always left open when they are uncoupled.

It is very important and almost imperative to keep any coupler as simple in its construction and as few in its parts as is possible to make it effective, and as any knuckle-opening device must add parts that are liable to get out of order, why not add a clause to any law that may be passed making it illegal for the trainmen to go between the cars equipped with M. C. B. couplers while either portion of the train is in motion? This would make the trainmen more careful and relieve the railroad company from any liability in suits for damages.

There have been some attempts lately to make couplers such that the knuckles can be closed from the side of the

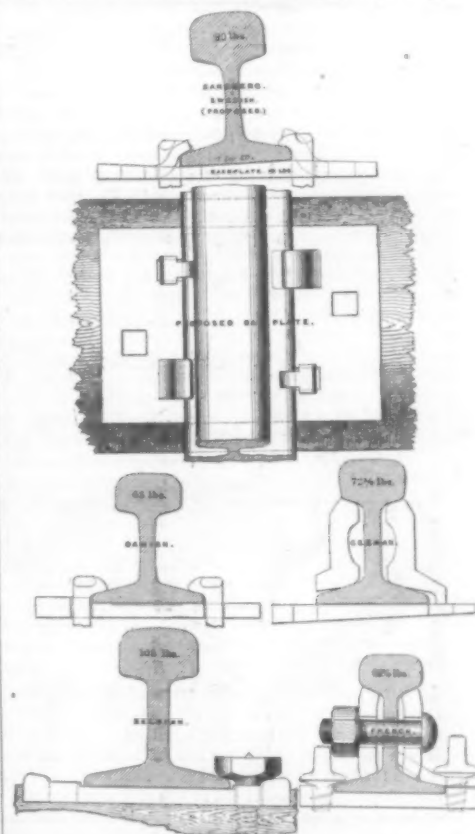
car, but this is absolutely useless between the M. C. B. couplers, as they will couple when one or both are open, and when they are to be coupled to the old system it is necessary to guide the link, so they might as well close the knuckle (if open) at the same time. T. L. McKEON.

Another Word on Tie Plates.

19 Great George Street, Westminster,  
LONDON S. W., March 12, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Feb. 20 your correspondent "Maintenance" says: "Again, consulting that remarkable encyclopedia of railroad knowledge, the files of the Railroad Gazette, I find in 1889, pp. 221 and 608, two designs by that distinguished and practical trackman, C. P. Sandberg, which strike me as very mechanical and simple. What has been the actual experience with them?" I am sorry to admit that I do not merit these compliments as far as the plates are concerned, for my designs have not met with anything like such general adoption as my rail sections and angular fish plate joints. In my papers read before the Institution of Civil Engineers on "Rail Joints and Steel Rails," in 1890, and on the "Use of Heavier Rails" in 1891, I was driven to suggest tie plates in my endeavor to obtain a permanent way by means of flange rails, as good as the ordinary English road with cast iron chairs, attempts to obtain a sufficiently wide base with flange rails having proved imprac-



ticable. In fact all English railways have lately increased the base of their chairs up to about 100 sq. in., as they found that those formerly used of smaller base cut the timber long before it became rotten. Otherwise no practical maintainer of track would make in two pieces that which might be made in one, or the rail direct on wooden ties.

I suggested in 1889 a design of tie plates, but this has not been adopted, perhaps because my clientele is principally in cold countries, such as Scandinavia and Canada, where the shimming of the ties from an occasional sudden rise of the sleepers during winter is a great trouble, arising from insufficient drainage, but this should not often occur on an old road. Localities are perfectly well known where such things may occur, and if plain spikes are used for fixing the plate to the tie, they are easily got off. I have had a couple of miles of road laid with my Goliath rail, on the Furness railway near Barrow, and these tie plates on a heavily worked piece of road have been laid side by side with the ordinary English rail. They have now been down eighteen months and have worked satisfactorily in every way. I have also laid about a mile in the Whitehaven tunnel. That is the whole laid of my tie plate. But smaller tie plates are used more and more on the Continent, even as far north as Denmark, where every sleeper laid during the last four years has been fixed with tie plates; but like everything else on the Continent, only of small dimensions, with about half the surface as compared to my design. Therefore of course they can only expect half the benefit from it.

The different types of tie plates used in France, Germany, Denmark and Belgium can be seen in my paper on the "Use of Heavier Rails," the Belgian being most interesting as the road is laid with 105-lb. rail with a view of solving the great problem of how to obtain an equally good road with a flange rail as with the English

type. Since my rail was first made in 1886, Belgium has progressed so fast that 15,000 to 20,000 tons of Goliath rails have been laid, and in two or three years' time the whole of the State lines will be laid with them.

The use of the metal ties has also been tried, but they have not given much satisfaction. In England metal ties for heavily worked lines have also been tested on the London & Northwestern, the Great Eastern, the Midland and the Northeastern railways, as shown in my paper on "Heavier Rails" above mentioned, against wooden ties but not with much satisfaction. I should think metal ties would have a better chance of competing with wooden ties on roads with light traffic and certainly not in tunnels, as the wood in the tunnels lasts longer than in the open owing to less frequent changes of temperature, but the metal corrodes twice as fast inside a tunnel as outside.

wheeled radial type pivoted to the main frame. The transmitting motion has been made the subject of a patent granted to Mr. Johnstone in 1885. The following are the general dimensions of the engine:

Cylinders.....	13 and 28 x 24 ins.
Driving wheels.....	40 ins. diameter.
Truck wheels.....	28 " "
Boiler shell.....	52 " "
Belpaire firebox.....	56 x 56 ins.
Number of tubes.....	201
Diameter of tubes.....	2 ins.
Length of tubes.....	15 ft. 9 ins.
Driving wheel base.....	8 " 4 "
Total wheel base.....	45 " 11 "
Weight on driving wheels.....	200,000 lbs.
Weight in working order.....	230,000 "
Capacity of tanks.....	3,000 galls.
Capacity of coal bunkers.....	5 tons.

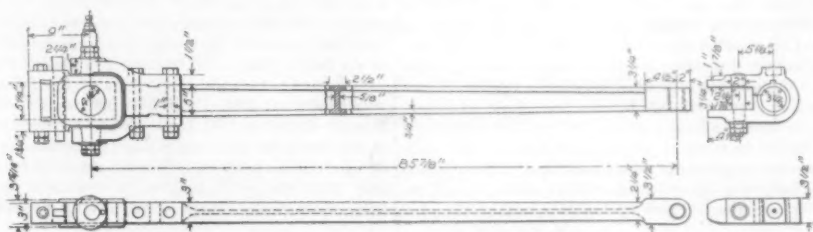


Fig. 1—Outside Main Rod—Johnstone Engine.

Therefore, your suggestion in your leader, of steel ties and 100-lb. rails laid on one line and wooden ties on the other, is very much to the point. On the Metropolitan Railway wooden ties are used, and last out two or three steel rails, just the reverse of an ordinary road. This railway was originally built with a 7½-in. wide flange rail, but they were all taken out and substituted for the ordinary rails used on English roads. This experience

The engines are fitted with the New York air pumps and driver brakes, the United States piston and valve rod packing, Damascus bronze bearings, Lowmoor crank pins, Sellers & Friedman non-lifting injectors, iron cabs, counter-pressure water brakes, Crosby whistles, steam gauges and clocks, Ashton pop valves, sand ejectors for the drivers, and Steam Gauge & Lantern Co.'s head lights. The cylinder head casings are of pressed steel. The air pump is the 7-in. Duplex pump made by the New York Air Brake Co. The engine trucks are

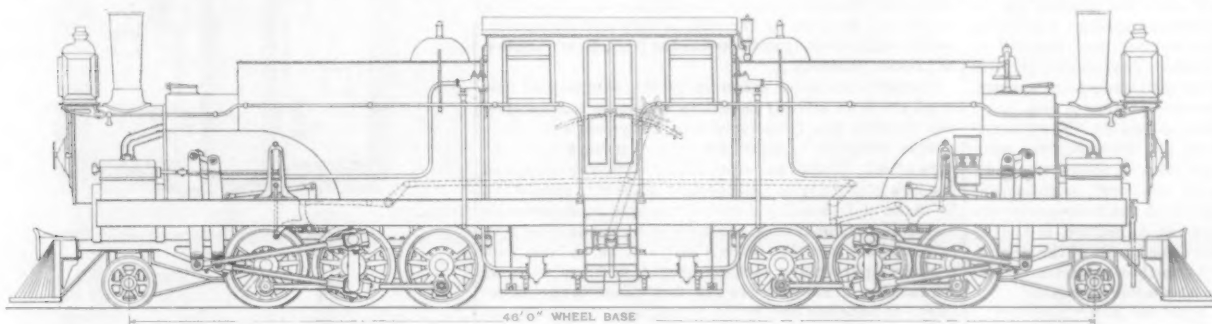
The low pressure piston is peculiar in having an inside and outside packing. This, with the high pressure piston, is shown in fig. 2.

The boiler is of the Belpaire type with the fire door at the side; it has butt joints with inside and outside welds. Between the crown sheet and the outside shell the stays are made of bolts with taper under the head with a nut on the top of the shell. Spacers of 1 in. gas pipe are placed around the bolts between the sheets.

The driving wheels with their frames form two six-wheel trucks, which carry the engine. The boilers are joined together with the cylinders by a heavy frame which extends from front to rear. Under each boiler at about the centre of the waist there is a ¾-in. thickening piece, placed on the under side of the shell. At this point there is a heavy casting, of saddle form, which is adapted to receive the extension which reaches down to a ball bearing, where there is a lower bearing attached to the truck frame. It is by this ball bearing that the weight of the upper part of the engine is carried. A side bearing is provided at this point to prevent oscillation; it consists of a roller formed like the frustum of a cone.

The valves are driven by a motion made solely of levers and without links or eccentrics and is shown in the detail drawings on the inset. The reversing rod extends backward to a common reverse lever which is moved by a spoke wheel that drives a pinion working in a rack, as shown. Sand boxes are placed in front of each set of drivers. The tanks are carried on top of the boiler.

The valve arrangements and cylinders are quite the same as those of the Johnstone compound system, illustrated before in these columns. In order to prevent an extreme movement or turning of the main six-wheel trucks, there is provided a vertical bar, 6 in. x 2 in., which carries a roller at its top end. It is placed directly in front of the cylinders and passes through a slot provided for it in the transoms which carry the centre pins of the pony trucks. A yoke bolted to the under side of the boiler prevents the extreme motion of the truck by acting as a stop for the movement of the vertical bar.



JOHNSTONE DOUBLE BOGIE COMPOUND LOCOMOTIVE.

(See the Inset for Details.)

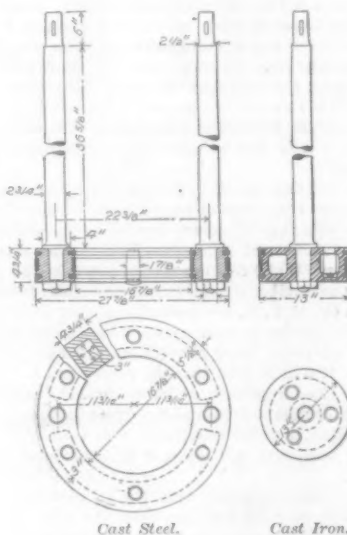


Fig. 2—Pistons—Johnstone Engine.

and several instances in France are contrary to my aim of getting as good a track with a flange as with a bull-head rail in chairs, and the case you mention in your leader will be a most interesting one toward solving the same problem for heavily worked traffic. But what is certain is that the saving of material in the rail and tie plate in such cases as those referred to by you is false economy, for the heavier the track can be made the less maintenance it will require, and in such instances the cost of maintenance, however important it may be, is not the only consideration, but it is the practical impossibility of executing repairs which is the principal point.

I have long wondered that America has been so slow in adopting the 100-lb. rails. The first 100-lb. rails on your side were laid a year ago by the Grand Trunk Railway in the St. Clair Tunnel. I am very glad to see it has come at last near New York as stated in your leader, but I am sorry it is to be combined with another experiment, namely, that of steel ties, as having two factors acting will complicate the experience, and one experiment made at a time would have been better. I should, therefore, have been in favor of laying the 100-lb. rails on oak ties with steel tie plates of several different types all on the same track. But the advancement of science is not the object in view of a practical trackman, who prefers to leave that distinction for somebody else.

C. P. SANDBERG.

#### Johnstone Double Bogie Compound Locomotive.

[WITH AN INSET.]

We give herewith illustrations of a double compound locomotive designed by Mr. F. W. Johnstone, Superintendent of Motive Power and Machinery of the Mexican Central Railway. The compound system for these engines is of the Johnstone type, which was illustrated in the *Railroad Gazette*, June 5, 1891. Each of the two combined engines is similar in type to the Mason bogie engines, but differs in that the cylinders are carried on the main frames with the boilers instead of on the trucks, a flexible design of mechanism being used to transmit the power to the driving wheels. The two boilers are carried on a long rigid frame, and the fireboxes have fire doors on the sides. The water supply is carried on saddle tanks. The front trucks are of the two-

fitted with Johnstone sectional brasses. The boiler tubes are of Franklinton, No. 13 wire gauge.

One of the most striking peculiarities of this engine is the method of transmitting the motion of the pistons to the driving wheels. There is a return crank on the centre pair of drivers which receives two connecting rods. These rods at the front end connect to vertical levers that are in turn connected together at the top. The front lever is attached to the crosshead, while the rear one is attached to the framework of the engine; hence, as the pistons move forward, the bottom end of the front lever moves ahead, while the bottom end of the rear lever moves back, and in this way motion is conveyed to the wheels. The connection of the crank pins to the connecting rods is a flexible one, and is shown in detail in fig. 1.

#### Pennsylvania Yard at Columbus, O.

The drawing printed herewith shows the sorting yard, for freight trains, of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Columbus, O., a comparatively new yard which was designed with special reference to economizing the room, which, it will be seen, was much cramped. Although it was impossible to make all the tracks long enough for the maximum train, there are a number in both the eastbound and westbound yards which will take from 40 to 50 cars, according to the length of the cars, and some of them more than that.

The eastbound tracks are numbered with even numbers and the westbound tracks with odd numbers. Westbound trains are received on tracks 7 and 11, and they are poled (pushed) off of these tracks into the westbound yard, tracks 13 to 33, inclusive, by an engine running on track No. 9. In case a car is to be weighed, the crossovers are thrown from 7 or 11 to No. 9, and the car is dropped on to the scales, after which it is kicked over and takes its ordinary course.

The eastbound movement is precisely the same; trains are received on tracks 8 and 12, and poled from there by an engine running on No. 10, up the ladder and on to tracks 14 to 34, inclusive. The scales in both yards are located so that the cars can be shifted on them without change of direction.

The cabooses used east of Columbus are poled on to the east caboose track from the east end of it and taken off from it at the west end by the engine making up eastbound trains, and thrown upon their trains. The cabooses used west of Columbus are poled from tracks 8 and 12 on to the west caboose track and taken off from it by the engine on track 9 and thrown upon the trains.

Track No. 35 runs all around the yard and is used for light engines. Engines to take out westbound trains follow the track near St. Clair avenue—lettered "outbound engine track," and back on to their trains on tracks 13 to 29, inclusive. Tracks 31 and 33 are used for company coal, which all comes from the east. The engines of trains arriving on tracks 8 and 12 go up the west ladder to the crossover leading to track 35, and from there west to St. Clair avenue on No. 35, where they take the track to the coal wharf. Engines for eastbound trains come out of the right hand side of the en-



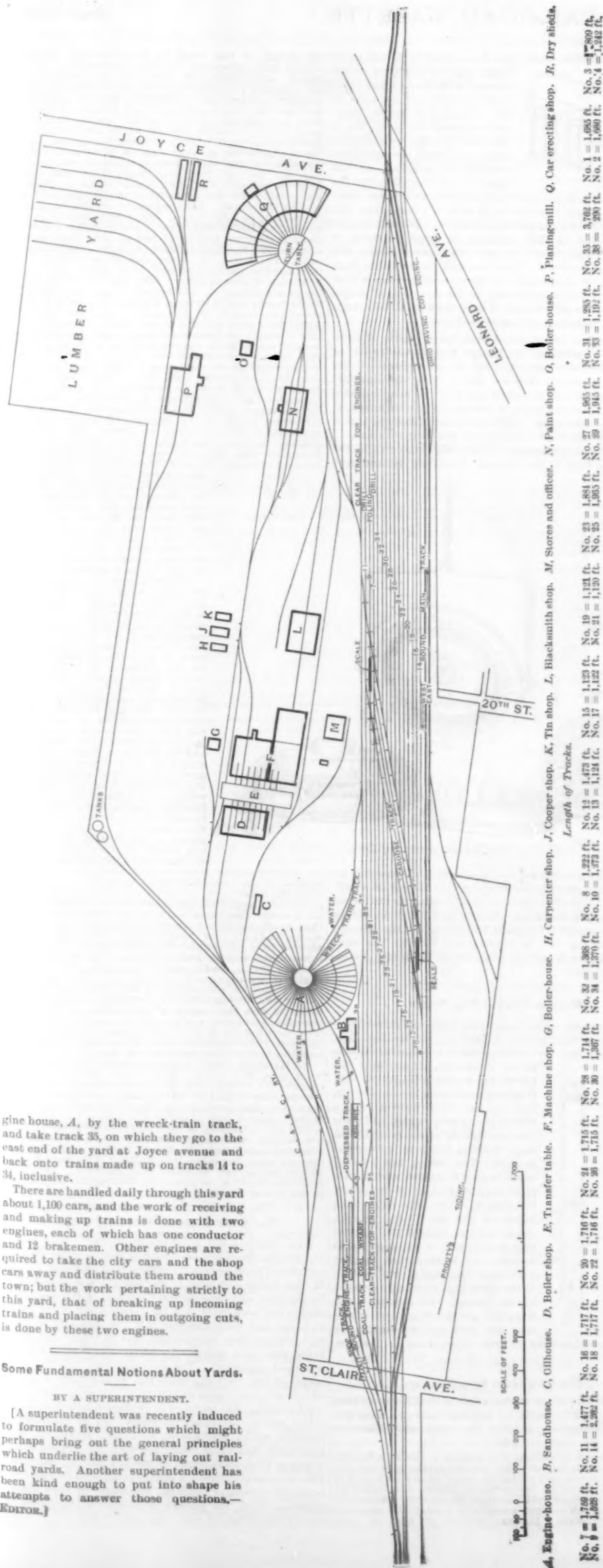
gine house, A, by the wreck-train track, and take track 35, on which they go to the east end of the yard at Joyce avenue and back onto trains made up on tracks 14 to 34, inclusive.

There are handled daily through this yard about 1,100 cars, and the work of receiving and making up trains is done with two engines, each of which has one conductor and 12 brakemen. Other engines are required to take the city cars and the shop cars away and distribute them around the town; but the work pertaining strictly to this yard, that of breaking up incoming trains and placing them in outgoing cuts, is done by these two engines.

#### Some Fundamental Notions About Yards.

BY A SUPERINTENDENT.

[A superintendent was recently induced to formulate five questions which might perhaps bring out the general principles which underlie the art of laying out railroad yards. Another superintendent has been kind enough to put into shape his attempts to answer those questions.—EDITOR.]



YARD AT COLUMBUS, OHIO—PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY—PITTSBURGH DIVISION.

In order to answer these questions intelligently it must be understood that conditions in existence in one kind of a yard may be entirely different from those in existence in another. For example, at a junctional yard of a large system, where several lines belonging to one system radiate, the conditions are quite different from those at a terminal yard of a similar road; and again, the receiving yard at any busy terminus works under quite different conditions from the despatching yard.

1.—What proportion should the car capacity of the yard bear to the total number of cars likely to pass through it each day?

This depends largely on the length of time which cars must be held for disposition and on the motive power which can be counted on to handle the business. For example, it is conceivable that if every car received in any yard were properly marked and billed ready to leave, so that there would be no necessity for holding cars of any sort for disposition, and granting that there were engines enough and sufficient other facilities for taking away cars as fast as they were made up into trains, the yard would not require more than twice the capacity of the number of cars handled in any specified time, representing the average detention of all the cars handled, exclusive, of course, of what may be termed leads and running tracks. My reason for believing that in any really good yard the capacity must be at least twice the number of cars handled in such specified time, is that that portion of the yard in which cars are received should be entirely distinct from that portion of the yard in which the cars are classified ready for departure. If, on the other hand, any considerable amount of freight be held one, two or three days for disposition (as grain and coal are held for reconsigning orders) there must be additional track facilities for storing one, two or three days' run of this particular traffic.

2.—What proportion of the number of trains received in the yard each day should the receiving tracks have a capacity to accommodate in order that the engines and crews may be promptly released?

It must again be said that this depends largely on the facilities which can be counted on for classifying and removing freight as rapidly as it is coming in. At one point, that I know of, a capacity for receiving ten trains when the daily run in busy times is between 40 and 50, has proved too little, but this is sometimes because certain tracks, which should legitimately be kept exclusively for receiving trains are made to do duty as storage tracks. In any case a considerable margin should be allowed for mishaps which prevent the steady flow of business.

3.—How many classifications must there be of the cars placed in trains for departure from the yard?

This depends entirely on the character of the yard. For a yard which is used as a despatching yard at a large terminal, where business is received from many connecting lines, and made up into trains which should be in station order, it is either necessary to have a system something like the English "double gridiron" system or enough classification tracks to switch the cars into groups according to the number of stations, number of branches and length of line for which the station order must be preserved. It is obviously wise, especially where classification is done from a single polling track, to make as many classifications as space and practicability will accommodate. On a double ladder, pointing "V" shaped, with the apex toward the polling track, it is probable that 15 tracks on each side of the lead track, or 31 tracks in all, is as many as should be put in, because the furthest tracks in such a ladder are even then a long distance from the apex, and switchmen must either walk or be carried a considerable distance, which either takes a good deal of time or is expensive in other ways. In a terminal receiving yard the number of classifications need not exceed the total number of roads or routes of transfer for connecting lines, plus the tracks to handle special classifications of business, such as freight house, grain elevator, team tracks and the like. For junctional yards, the number of classifications needed are often not very great, unless the amount of business handled is very large, and, in addition to the distribution into groups for various branches, there must be also a classification of trains in station order. In any case, if the amount of ground available is not sufficient to give the full number of classifications really needed, it would often be better, it seems to me, to do the classifying in two operations; the first time simply forming groups and the second time subdividing these groups, so as to bring cars in station order, or whatever other arrangement is necessary.

4.—What connection, if any, should there be between the east and west bound yards? This is dependent upon the number of cars liable to change their direction in the yard.

In answer to this question it seems to me that for junctional yards there need be very little intercourse between east and west bound or north and south bound yards; simply enough connection to make it possible to interchange motive power handily and rapidly. In terminal yards there is a little more reason for closer relations, especially if transfer of foreign cars is made in or near the despatching yard, for in such a case the foreign cars made empty would naturally be handled with the loaded cars going to foreign lines in the receiving yard.

5.—What position should the repair shops occupy relatively to the rest of the yard, and what should be their

capacity in proportion to the daily number of cars passing through?

I think there is no doubt that repair shops, or such as are capable of extensive yard repairs, should be provided at every important junction or terminal yard, and while it may be wise to confine the important erecting shops to one or two points on the system, it certainly is not wise, in my estimation, to confine the repair work (or such repair work as can be done out of doors) to such points. It is frequently the practice with large railroads to run cars which are in bad and in even dangerous condition a number of miles to some important shops to be repaired when the cars are badly needed at the point from which they are sent and must be returned there as soon as put in proper condition. In locating repair yards, they should be located conveniently to the despatching yards, especially so at a terminal point. The importance of repairing cars received off the road is not nearly so great as a usual thing.

When these questions were first put in my hands with the request that I give my views as to the possible laying down of general rules which could be furnished in all cases, I was inclined to think that such rules were impossible. Further consideration of the subject, however, has made me think that perhaps it was possible if the rules were sufficiently flexible to admit of adaptation to different conditions. One of the greatest controlling features, or course, is the amount of ground and its topography and shape which is available for yard use, and it is often a most perplexing one. Until recently, however, yards really well adapted to the service which they were expected to perform, were not built in this country even where the best of ground was available. This has been because the subject has not had, until recent years, the consideration of men who could combine sufficient practical knowledge of the existing conditions and of engineering construction. It would often be wise for a road to abandon entirely a site for a yard which may be, by any reason, so ill-shaped or topographically bad as to make the construction of a good yard impossible. A more favorable site should be selected, even though it may be further from any desired point. There are two features in yard practice which are often neglected, and which afterward are to blame for many accidents, perhaps trifling in themselves, but which cause more or less serious delay. These are slip switches and curved yard tracks. I recognize perfectly well the value of slip switches in their proper place; they are often absolutely necessary; but in laying out new yards they can often be entirely avoided and, if they can be, without great loss of space, they certainly should. Where slip switches are operated from interlocking towers or by switch-tenders, they can be provided with movable point frogs which makes them safe, though after all expensive both in first cost and maintenance. Curved tracks are often used unnecessarily, though, of course, they must sometimes be used in yards to save space. In any case they should be rated as a bad feature, increasing the difficulty of handling the yards without petty accidents such as the cornering of cars and the like.

#### The Canda Contracting Chill.

Before describing the special features of this chill, it may be well to state very briefly what the peculiarities of a contracting chill are, although presumably most of our readers are by this time familiar with them. In the contracting chill the chilling ring, which comes in contact with the molten metal, is made of a series of segments, separated by very narrow slots. These segments are joined to the outer ring, which preserves the cylindrical form of the chill, by thin webs. The result is that when the metal of the chill itself is heated by the hot metal poured into it, these thin webs and the segmental chilling blocks are heated much more rapidly than the outer ring. Therefore, while the circumference of the outer ring enlarges but slowly, the chilling blocks move inward, owing to the expansion of the webs, and the result is that the chilling surface follows up the cooling metal and keeps the chill in constant contact with the tread of the wheel that is being cast in the chill.

The advantages of a contracting chill are, mainly, that the metal can be poured very hot, getting a stronger wheel without chill-cracks, perfect form and uniform depth of chill; and while the first cost of the contracting chill exceeds that of the ordinary chill, this is more than compensated for by its durability, to say nothing of the saving in waste of product, and the improved quality of the output.

In the Whitney chill the outer ring is solid. The chilling blocks are cast separate from each other, strips of asbestos being inserted in the mold in which the chill is cast in order to keep the segments apart. In the Barr and the Ramapo chills the outer ring has a channel going entirely around it, through which either steam or water may be forced, and in these chills the chilling ring is cast solid and the segments are sawed apart.

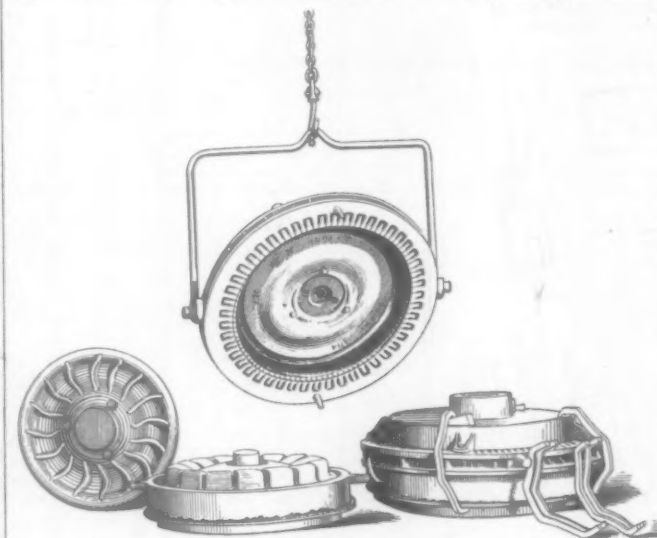
The Canda chill is like these in this last particular; that is, the chilling ring is cast solid and then sawed. But its peculiarity is in the form or design of the outer ring. This latter is composed of two or more rings. In practice, chills made with three and four outer rings have given the best results. These rings are kept apart by light cast iron struts cast integral with the rings. The webs which carry the chilling blocks are attached to

these rings alternately; that is, in a chill with four outer rings, one web segment would connect with the first and third rings, the next web segment to the second and fourth rings and so around the chill. Or if the chill is constructed with three outer rings, the web of one segment is attached to the upper and middle ring, and the

web of the next segment to the middle and lower ring, and so on around the circle. A piece of a three-ring chill showing this arrangement is shown in the cut. It will be seen that by this arrangement large provision is made for the escape of heat and gases during the casting of a wheel. It is claimed that by this construction the temperature of the sustaining rings is kept down, and consequently they do not warp out of shape. Moreover, the attachment of each segment to two rings holds the segment to accurate position.

The result of actual use of a very large number of these chills in the works of the Ensign Manufacturing Co., at Huntington, has demonstrated the correctness of the principle on which they are made. They are durable, and while the iron is poured as hot as it can be drawn from the ladle, the losses of wheels cast in them are reduced to a minimum. Chill cracks are unknown, and it is said that absolute roundness of wheels is obtained.

The general appearance of the chill is shown in the engraving from a photograph. It should be said that



The Canda Contracting Chill.

before the segments are cut apart with the saw the interior of the chilling ring is accurately turned on a mill or lathe. This chill, like the Barr, leaves on the tread of the wheel a sharp fin. This is ground off by a very ingenious grinder designed and made by the Ensign Manufacturing Co., at Huntington, W. Va. The chill which we have described is the invention of Mr. Ferdinand E. Canda.

#### Mexican Central Flag Holder.

A neat casing for holding signal flags, shown in the accompanying illustration, is used on the Mexican Central. It is a cast iron bracket which is bolted to the side of the smokebox. It carries a hollow casing having a transverse bolt C with countersunk heads. On this bolt the flag sticks swivel. B is a Russia iron casing which fits over the base casting D and encloses the flags, holding them in a vertical position. The casing has a heavy top E to give it weight, and a face plate at H of brass in which are cut the slots A, A, A. The flag sticks swing on the pin C, and when a signal is to be carried the desired flag is dropped to an angle of 45 degrees and is supported in that position by the edge of the casting D, the other flags remaining covered by the casing. In this way the flags are always kept just where they are used and so escape the rough handling they receive when kept in the top boxes.



#### The Chignecto Ship Railway.

At a meeting of the shareholders of the Chignecto Ship Railway held recently in London, in explaining the financial difficulties in which the company had become involved, the chairman said:

"Our object in calling you together to-day is to consider a scheme for carrying this undertaking to completion; but as you will probably want to know how it is that the interest on the preferred shares, due January 1 last, has not been paid I propose in the first instance to address myself to that question. Under the contract for construction, Messrs. Meiggs & Son, in con-

sideration of the issue to them of the company's shares and debenture capital, undertook to construct and equip the line to the satisfaction of the company's engineers, and to pay the interest on the preference shares and debentures during construction, and until the line is approved and passed by the Canadian government. They provided the funds for payment of the debenture interest up to and including the half year due Jan. 1, 1892, but the interest on the preferred shares due on that date is in arrear. This circumstance would have been at once communicated to you but for the fact that negotiations were then in progress which it was hoped would result in funds being provided for the payment of the interest and completing the works. The contractors suspended work on our railway in August last. This, they informed us, they were compelled to do by the financial crisis which had recently occurred and which had at that time rendered it impossible for them to place the balance of the debentures. Previous to the suspension of the work an act of the Canadian parliament had been passed granting an extension of time to July 1, 1893, for the completion of the undertaking. It was believed that the suspension of the works would be for a limited time only, and that about the month of November confidence generally would have been restored in the minds of investors, and that it would be then possible to place the company's debentures, so as to resume work at an early period in 1892. The contractors said that if the works were entirely suspended up to the spring of 1892 there was ample time to complete the work before July 1, 1893. In our desire to avoid delay in resuming the works, we in November last memorialized the Dominion government for assistance, either by subscribing for the unissued debenture bonds of the company or commencing the payment of the subsidy as on July 1, 1893, instead of waiting for the completion of the undertaking. In December this memorial was under consideration. In January the directors were informed that it could not be

entertained by the government. Further efforts, however, were made to induce them to reconsider their determination, but without success, and early in February an official reply was sent by the government that they were obliged reluctantly to come to the conclusion that it was not possible to give present assistance to the company.

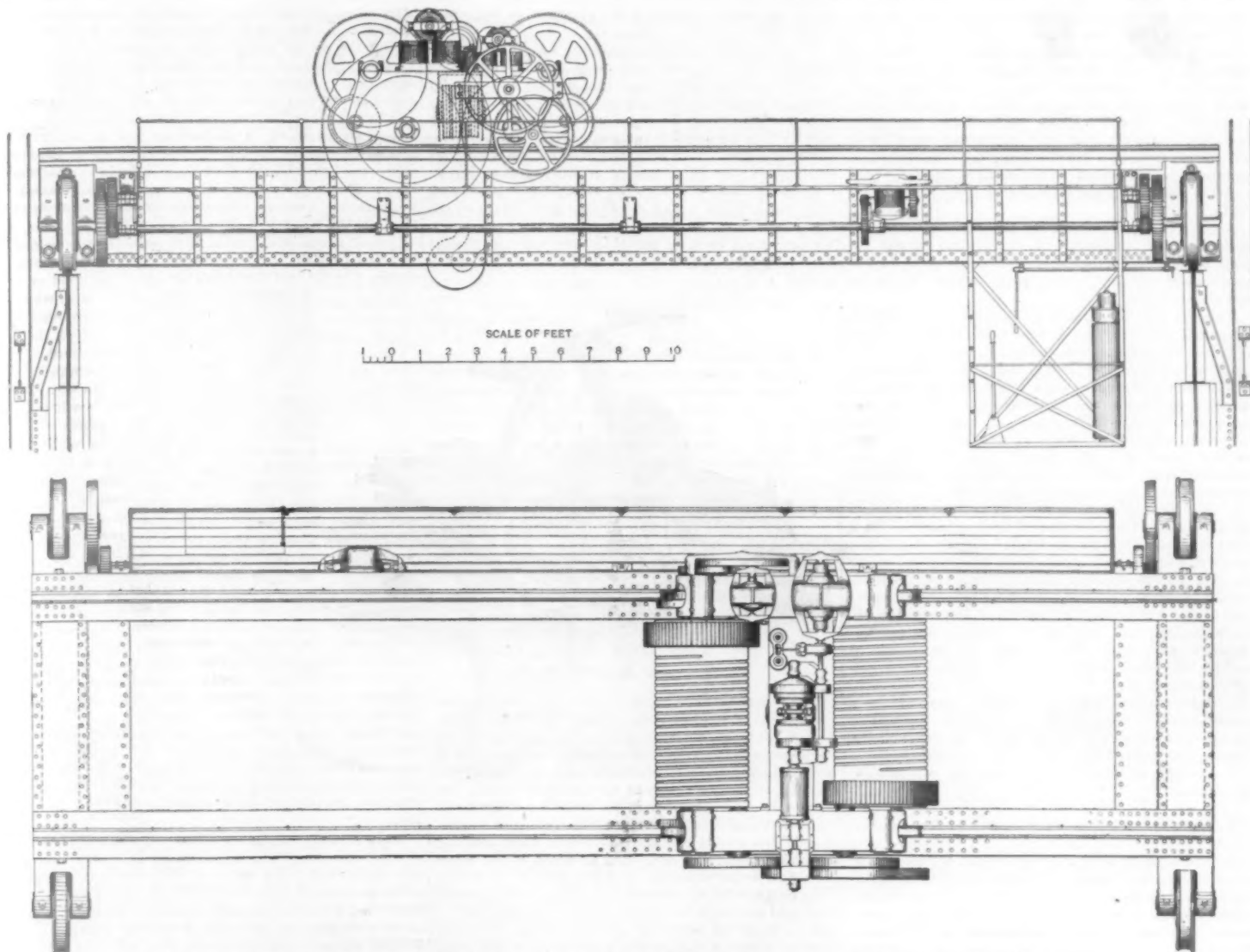
"It now becomes a matter for consideration what steps will be advisable to take in respect to the default of the contractors, and what means should be adopted for insuring the completion of the works. We felt that if we could induce the government to give the assistance asked for, the difficulty in raising the required funds would have disappeared. Seeing that this could not be effected, and that the January interest was not forthcoming, we called you together to confer with you as to what should be done under the circumstances. Sir John Fowler and Sir Benjamin Baker have furnished us with reports, and it appears that, in their opinion £209,255 will suffice for the completion of the works. We have to deal with the fact that the contractors are unable to carry on the works, and that the them consist of unissued debenture means at our disposal for completing bonds of the company to the amount of £294,100, and about £18,000 in ordinary shares. Our position, therefore, is that, on account of the present financial depression, we cannot place the debentures, which if they could be disposed of as the first issue was, would provide ample funds to complete work. We expected, when we called this meeting, that we should have a scheme for the completion of the works ready for your consideration, but on account of absence from this country of a gentleman whose adhesion is necessary, and for other reasons, it has been impossible to get it ready, and we must ask you to meet us again at an adjourned meeting, say, this day three weeks; but we should like to have the co-operation of two or three of you to form a committee to confer with us as to the best means of completing the works. I therefore move that a committee be appointed to confer with the directors as to the best means to be adopted for insuring the completion of the works, and to report at an adjourned meeting on March 21, 1892."

Mr. Ketchum, Chief Engineer, stated that he left the work in perfect order. There were twelve miles of track of the railroad laid, and a very short time—perhaps six months—would finish all the grading and all the masonry. The prospects of the traffic were very good, because the tonnage on either side within the sphere of traffic was increasing at the rate of 400,000 or 500,000 tons per annum—principally coasting trade. The line of steamers from Charlottetown to Boston made but one trip per week, but when this railroad was opened they would be enabled to make two journeys. The risks were absolutely at an end. The meeting was adjourned to the 21st of March.

#### The Shaw Electric Traveling Crane

Until within a few years nearly all the cranes in use in machine shops and foundries in this country were of the jibbed type, despite its serious limitations as to area of floor served and large proportion of the floor occupied by the mast and thus rendered useless. A few traveling cranes had been built, but they were generally so crude in design and workmanship, and consequently so slow and jerky in their movements, that they met with little favor, especially in foundries where smoothness of action was most important. The comparatively late development of the traveling crane was undoubtedly due, not only to the fact that a higher order of design and better workmanship was required to produce a traveling crane which would operate satisfactorily than to construct a jib crane which would work with equal steadiness, but also to the difficulties connected with the transmission of power from an external source to a moving machine. This necessitated either a square shaft with its cumbersome and expensive tumbling bearings, or rope transmission. With the advent of electric transmission of energy this difficulty was done away with.





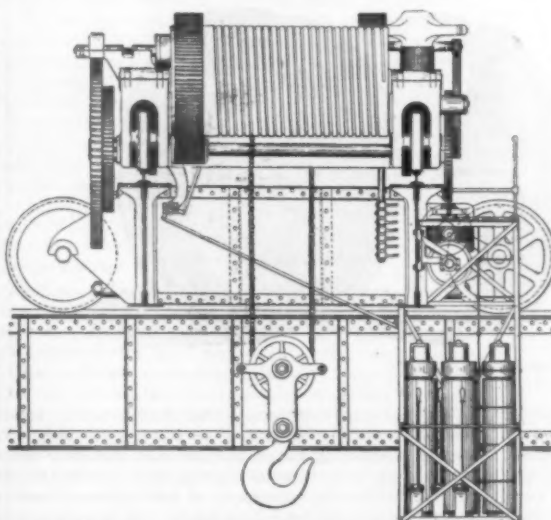
45-ton Electric Traveling Crane, Designed for the U. S. Navy Yard Boiler Shop, New York, by the Shaw Electric Crane Company.

The first triple motor electric traveling crane put in practical operation anywhere is believed to have been built from the designs of Mr. Alton J. Shaw by the E. P. Allis Co., and erected in their foundry, in Milwaukee, Wis. Although an experimental machine, and naturally somewhat crude in many of its details, it was at once pronounced by all who saw it in operation to be superior to anything previously introduced. The molders were especially enthusiastic in its praise, as it was far smoother and steadier in its movements and capable of much more accurate handling than the power cranes in use at that time. While the mechanically driven cranes had but two speeds of traverse and four of hoist, the electric crane had an indefinite number, and any movement could be gradually and smoothly accelerated or retarded or maintained at any speed between the highest and lowest at the will of the operator. All this was accomplished without clutches or mechanical disengagements of any kind. Next to the smoothness of action the simplicity of this crane was the first feature to impress one accustomed to the intricate mechanism of the older machines.

There have since been installed in the works of the E. P. Allis Co. two more electric traveling cranes built by The Shaw Electric Crane Co., one crane of 30 tons capacity operating on the same tracks with the first, and the other of 15 tons capacity in the Reliance Works No. 2 erecting shop.

A somewhat detailed description of this crane will serve for this type of crane in general. The line drawings herewith show a 45-ton crane designed by the Shaw Company for the boiler shop of the U. S. Navy Yard, New York. While not as rapid in its movements as some which have since been constructed, it was, when put in, must faster than the majority of cranes then in use. It has a maximum hoisting speed of 25 ft., a bridge or longitudinal traverse speed of 350 ft., and a trolley or transverse speed of 125 ft. per minute. The speed of each of these movements may be raised from nearly zero to the maximum simply by moving the reversing lever a greater or less distance either side of its mid-position. As but one lever is required for each movement, the manipulation required is of the simplest possible character. The crane is fitted with incandescent lamps of 600 total candle power, which brilliantly illuminate the floor below whenever the crane is used at night.

This crane, as are all those built by this company, is fitted with duplex automatic brakes, to which, in large part, is due the accuracy with which the load can be



handled in hoisting and lowering. These brakes not only insure against the accidental dropping of the load from any cause other than breakage of parts, but absolutely prevent any possibility of "racing" in lowering. These brakes are entirely automatic in their operation, and do not depend for their action on the skill or vigilance of the operator. One of them, the mechanical brake, is applied continuously by the reaction of the load itself, the force with which it is applied being proportional to and increasing with the load, and released by the pull of the motor. The other is applied by a powerful spring, and is always "on" except when withdrawn by the action of a solenoid in series with the hoisting motor.

Without the mechanical brake the crane would "race" in lowering, as the magnetic brake is then withdrawn by the current which actuates the motor, and both the motor and load act in the same direction. Without the magnetic brake the load could not be stopped promptly after either hoisting or lowering, on account of the momentum of the armature. Without the capability of instantly checking the movement of the load, accurate handling would be impossible, as when the current is thrown off it would always go a little too far or not far enough. The two brakes acting in combi-

nation give great accuracy of control, which together with the extremely slow speed at which the crane may be run enable the heaviest loads within the capacity of the crane to be set with absolute accuracy.

All truck wheels are cast from charcoal iron and the threads are chilled deep and hard and ground true. These wheels are considered by the makers to be better than steel as the hard surface insures great durability while the accuracy attained by grinding causes the transverse movements to be extremely free from vibration.

All the shafts are large and bearings are unusually long. Great attention is given to the matter of accessibility, the machinery being so arranged that all important details may be removed and replaced readily without disturbing other parts. Bearings are capped wherever possible. The girders are very rigid, laterally as well as vertically, and have a large margin of safety.

These cranes are built by the Shaw Electric Crane Co., Muskegon, Mich., (Manning, Maxwell & Moore, New York & Chicago, sole sales agents.) The company is now building several electric traveling cranes to hoist 100 ft., a minute, and is prepared to contract for cranes of any type or capacity for any class of service.

#### Railroad Lectures at Troy.

It has been decided to have a special course of railroad lectures before the senior class at the Rensselaer Polytechnic Institute, and Mr. T. M. Cleemann, of Philadelphia, has consented to give this course. The basis of the course will be based on Mr. Cleemann's well known little book, the "Railroad Engineers' Practice," of which a new edition is now in preparation. As the new edition will not be ready in time for this course, copies of the old edition will be distributed among the students.

Mr. Cleemann will begin by taking up the preliminary survey. He will discuss the relation of the probable character and amount of traffic to the amount of capital that may justifiably be spent in securing easy curves and light grades. He will discuss the division of a railroad into operating divisions, showing how the ruling grade on a division can be used throughout that division, illustrating by the case of the Pennsylvania Railroad and its three operating divisions between

Pittsburgh and the summit of the Alleghenies. He will also discuss ridge lines and valley lines, and the developments for crossing mountain ranges, and will then detail the practical methods of getting preliminary information in a mountain country, without maps, with hand instruments, illustrating this by practice in the Cordilleras. He will show how the ordinary systems of co-ordinate axes are used for fixing the position of points on the grounds with transit, level and clinometer, explaining how the width of the strip of ground so surveyed is limited by the information got with the aneroid.

To emphasize the reasons for the various operations performed, the students will be required to plot the notes of an actual preliminary survey, and make a paper location and estimate of the quantities of excavation and masonry, etc.

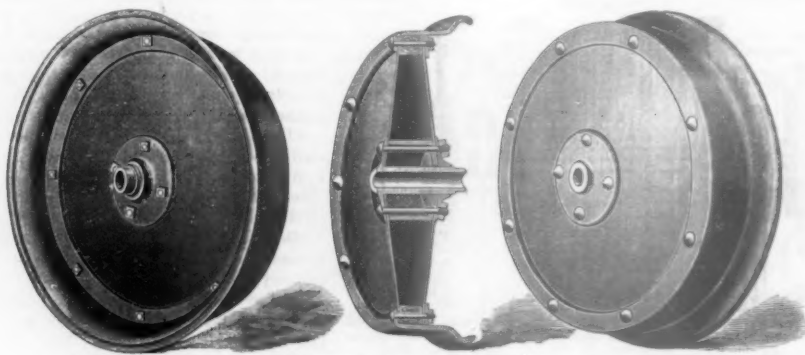
A lecture will be devoted to culverts, showing how the proper waterway can be estimated from the drainage area; the ordinary dimensions of box culverts, the proper proportioning of arches and bridge abutments. The lecturer will then explain the different classes of masonry, emphasize the importance of the bond, and tell how mortar should be made and how cement is to be tested. He will also treat of foundations, the supporting power of rock, gravel, sand and mud, the spreading at the bottom for additional bearing surface, the use of cribs, the necessity of piles, etc.

In earthwork the staking out will be dwelt upon, and the calculations for monthly and final estimates. Trestles will be the subject of one lecture, tunnels of another, bridge and rail inspection another; tracklaying, water stations and the organization of laboring gangs will be treated in others, and also something will be said in regard to the way in which a contractor starts his work. The maintenance of way on the finished railroad will complete the course. Bridges will not be mentioned because they are treated of in the lectures of the Director of the Institute.

The reader will see that Mr. Cleemann has outlined a course of lectures which cannot fail to be of uncommon interest and value to the students. To the lecturer himself, who has the time, the taste and the knowledge to properly prepare such a course, the duty will be a delightful one.

#### The Kalamazoo Steel Wheel and New Hand Car.

The new all steel hand car wheel which is now offered by the Kalamazoo Company is very clearly shown in the engraving. Its diameter is 20 in., width of tread  $3\frac{1}{2}$  in., depth of flange  $1\frac{1}{2}$  in., and the steel of the tire is  $\frac{1}{8}$  in. thick. The flange is made to correspond in its dimensions to the M. C. B. standard, as is also the distance between the backs of flanges. The hub is of malleable



Kalamazoo Hand Car Wheel.

cast iron with a cap or flange on one end, and another malleable iron flange which is pressed over the opposite end of the hub. Between these two flanges or caps and the cup shaped casting the steel discs are placed, and then four  $\frac{1}{2}$  in. steel bolts are driven through the nuts, screwed down tight and ends of bolts riveted. A malleable ring fits against the outer edge of the inner disc, and eight steel bolts secure this ring, the two discs and felloe between the discs, to the turned down edge of the tire. The discs are made from number 16 gauge sheet steel. They are placed with their convex sides outward, which makes dishing impossible.

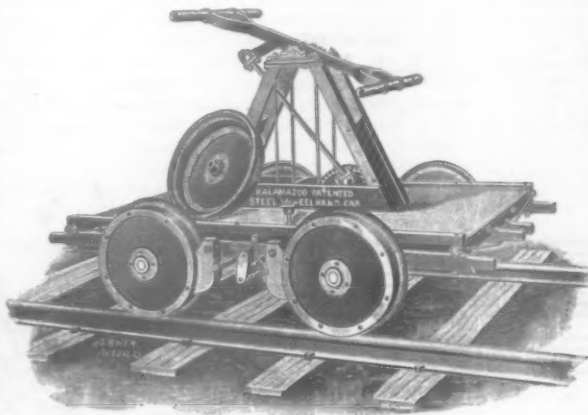
A new hand car fitted with the wheel above described is also illustrated. This is made with white oak frame, decked with matched oak, the decking being 6 ft. 4 in. long. The car is thoroughly trussed in all directions. The driving gear is made somewhat heavier than is usual. The usual gear is  $3\frac{1}{2}$  to 1, but two other proportions are used if required. The steel axles are  $1\frac{1}{4}$  or  $1\frac{1}{2}$  in. as ordered.

#### Economies in Maintenance of Way.\*

The roadway more than any other department requires methodical supervision, and systematized checks upon the men who are widely distributed over many miles of territory. The piece work system, so successfully followed in the shops, is impracticable for track

work, because its quality is not apparent to the senses until weeks after its completion.

The maintenance of roadway and track is an occupation requiring strict attention to a multiplicity of simple and seemingly unimportant details, and calls for habits of close and accurate observation. Conditions arising must be correctly discerned and analyzed, so the judgment will be prepared to successfully solve the problems so encountered. Such being the case, we determine by implication that in a greater or less degree each road possesses an individuality of its own, and is impressed with characteristics and conditions peculiar to itself. To thoroughly master the problems involved in the maintenance of any road, its special features must be studied until fully understood, and the proper remedies determined.



New Kalamazoo Hand Car.

Eight years ago, in a paper read at one of the annual conventions of the American Society of Civil Engineers, I made the following observation, "In nothing do our track men need to be so fully drilled as in the matter of thorough and conscientious track work, particularly in tamping, to stand the service to which our tracks are subjected. To track foremen the condition of the track is largely a matter of appearance to the eye, and too frequently they are led into hurried styles of work, covering too much ground in a day, often impelled by the desire to make a better showing they are content to shovel tamp, or if bars or picks are used the work is indifferently done, and although the track may be very pleasant to look at, in a few weeks at best the traffic or stormy weather destroys the surface and line, and the same track must again receive attention."

What was important then, is even more so to-day, and subsequent experience, as well as three years largely spent in examining the conditions and watching the varying methods on many lines, has amply verified and even emphasized the correctness of my deductions, and as a general proposition, I have found it to hold equally true on light traffic lines with small track forces, as it does on lines of heavy business and large section gangs.

It goes without saying that thorough work implies tight joints, the use of track level, true gauge, and conscientious tamping and attention to minor details whenever and wherever they are met. For the economical maintenance of track the section men should only be used as a skirmishing force to preserve the track when brought to high condition; for the work of general repairs or renewals they should never be so used, for the struggle will necessarily be on the defensive, with no chance for aggressive improvements. When in the season for active repairs and renewals forces are kept so low that little or no advance can be made in improving the condition of the track, a large proportion of the men's time is spent upon the hand car, moving from place to place, as attention to the most urgent points may direct. It is unnecessary to say that the time so consumed in moving about is absolutely wasted, while in dodging about to repair the defects in track due to former traffic, seeking to make it tolerable for current business, the entire amount expended becomes a tax upon money already earned, for labor so employed makes no provision for the future, but neglects the sub-

stantial repairs essential for the coming fall and winter's business. As early in the spring as settled weather will permit the section gang should be increased to their maximum strength, and the work of renewals should be substantially completed by the end of June, when the forces can be very largely reduced. By beginning early you have your pick of the best laborers, who later in the season are attracted to the harvest field or municipal and miscellaneous construction work, in which rates of wages paid rule higher than those afforded to section labor. The early season, by reason of the moderate temperature, is far more favorable for hard, steady work than are the hot, sultry days of midsummer.

In any event, with track work as with any other, if you fail to push it, rest assured it will push you, and should it be delayed that long, the heavy fall traffic, not infrequently attended with unfavorable weather, will compel an increase of track forces at a time when from the nature of things the work must be hurriedly and incompletely done, in order to prepare for frost. Thus from year to year the track lacks in stability, is shaky, and the parts being loose are permitted to move independently, so that the amount of labor required to keep such track in tolerable condition is in excess of the amount necessary when judiciously timed in thorough and systematic repairs. When sufficient forces engage early in the work of renewals, the men can proceed from point to point, completing everything as they go; 'tis true they may spend two days in going over the same ground that could be temporarily improved in one. In the first case, however, defects are not only corrected for the present, with little regard for permanence, but the track is as thoroughly tamped, tied and secured as the material at hand will permit, and with ordinary attention, should last the season out, whereas under the other system, the track being but temporarily repaired, periodical returns are necessary to preserve it in tolerable condition, and in the end three or four days' labor per year are spent in palliative measures, whereas two days' thorough work in the start would have sufficed for the year.

While recently comparing views with a railroad official of wide experience, who is recognized as a very competent director of track work, he told me that in 1886, when he assumed control of a part of one of our most important lines, the amount expended for track labor on the two principal divisions of the line amounted to \$200,000 annually, and the track then was only in that tolerable condition which the absence of system makes possible. The year following he increased the forces early, and insisted on thorough work. He was as watchful of those who attempted to do too much, as of those who failed to accomplish enough. The result of the season's work showed a marked general betterment of condition, the cost of labor for the year being reduced to \$163,000. The system was continued through 1888 with more marked improvements, at a cost of only \$139,000 for the year, since which time the divisions in questions have been brought to a high standard of condition, at a yearly cost not exceeding \$120,000, or 60 per cent. of the amount formerly expended to secure a much lower standard of excellence, to say nothing of the fact that the demands upon the track are severer now than ever, not only as to traffic, but in speed of trains, and weight of loads and motive power.

I know of a case where a line of moderate traffic and depleted exchequer permitted its track to fall into such condition that the State Commissioner of Railroads compelled them in places to reduce the speed of trains. After two or three experienced men had declined to take charge with the means at hand a roadmaster of my acquaintance took hold. He was thoroughly imbued with and had experienced the value of thoroughgoing work even on weak lines. It will be imagined that the track was in miserable condition, and the men were rushing here and there to hurriedly improve the most serious places, which, being inadequately remedied, would rapidly retrograde, so the men were never able to make satisfactory headway. The first work of the new roadmaster was to send his men over their sections to shim the places that were badly out of surface. This was very quickly done, and at once afforded a short period of relief, which enabled him to thoroughly work some portion of each section. He continued this method to the end of the season, and the track passed into winter in reasonably good shape for the traffic. The speed restrictions were withdrawn, and this was accomplished at less cost for labor than had been expended the year previous. The section foremen declared they had worked no harder, and could not understand why the results had been so marked in the face of decreased forces.

It has been my experience that, conditions being equal, the foreman having the best track called for, or at least received, the least material. This is particularly true on lines where for various reasons maintenance of way has been neglected. In the absence of proper instruction and direction the mechanical skill of an occasional section foreman will be noticeable by the strikingly superior condition of his track, and if you pursue the inquiry, you

\*Read before the New York Railroad Club at a regular meeting, March 17, 1892, by Mr. Benjamin Roege, M. Am. Soc. C. E.



will generally find that he receives the smallest amount of rail, on the score that he does not need it, and at the same time he is handicapped with a smaller force or longer section on the ground that he can properly care for it. I have a number of such cases in mind, and looking at the question in any light you please, I have no hesitation in saying that thorough track work is not only the most economical in the end, but it is actually cheaper for the first, as well as succeeding years of its application.

In no feature of track work are the evils of hurried and imperfect methods more conspicuously apparent, than where resorted to in the laying of new rails. In order to make a good showing, and to secure speedy, if only partial relief from the worn and loosely fastened rails which are being removed, miles of new rails are sometimes laid before the joints are properly put up and the new rail surfaced and lined. As a natural consequence, the new rail, in adjusting itself to its imperfect bearings, soon becomes surface kinked and bent, so to ever afterwards defy your attempts to make good track of it. Much extra labor will be required to keep the track in fair condition, and so far as labor is concerned, will afford but little advantage over the old rail removed.

To properly care for new rails so as to reap the advantage of their use, stretches only of such length should be laid as can be given immediate attention. Let a half mile be laid, and temporarily skimmied to surface, as fast as the rail is laid, so as to protect them against the traffic of the day. When the half mile is down, proceed from one end to remove the shims and permanently perfect the surface, and line as you go. When completed, proceed with the second half mile, and so continue until the work is completed. The work will appear to be slower, some of the new rails will remain out of the track a few weeks longer, but by the close of the season the work of laying will have been better performed, the surface of the rail will have been preserved, and that at less cost for labor than the more impatient method, which leads to waste and ruin. How often do we hear demands for stiffer section rails, because the lighter sections have been wrecked from want of care and faulty laying, and while the heavier rail which replaces it may be a little better fitted to withstand misuse, it eventually succumbs to the same bad treatment, to be in its turn condemned.

Without doubt the increase of wheel pressure upon our rails calls for stiffer section rails, yet I have no hesitation in saying that heavy rails are often called for in order to correct defects entirely due to other causes. Here is a rail of medium weight, showing no defects excepting at the joint; manifestly a better fastening or more enlightened labor at the joint is needed, rather than a heavier section rail, which must in turn suffer from the same neglect.

If the rail cuts into the tie a wider-based rail is demanded, while the tie could be more cheaply and more effectively protected by metal tie plates, especially designed for the purpose. We have been inclined to look to the rail maker to correct all the evils encountered in our road work; the head of the rail has been changed in form to afford a bearing for our joint fastenings, and its base has been increased in width to compensate for soft ties and imperfect fastenings.

Those who are familiar with track work appreciate the fact that when rail is carefully spiked to new oak ties, and thoroughly tamped, but very little labor is required to preserve it until the ties begin to soften and cut in, then the undulations of the rail become more pronounced, the spikes pull and conditions of instability arise, calling for greatly increased labor to correct. This at once suggests the use of metal tie plates which will afford flexible yet unyielding support to the rail, by which means, so far as the rail bearing portions of the tie are concerned, the conditions of a new tie are preserved throughout its life. This not only minimizes the ordinary track labor but saves entirely the work of adding down ties and restoring the rail to position, involving respiking, with the resultant injury to ties due to frequent spiking.

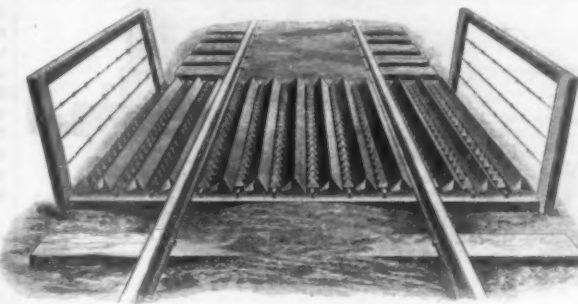
As much labor is required to keep the track securely fastened down to gauge, so will much of that work be saved by the application of tie plates, which, while protecting the tie from being cut in, securely holds the track the gauge, and prevents the undulations due to cut ties and consequent lifting of spikes.

We will now pass to a consideration of the economies involved in the question of tie renewals. But few fully recognize and appreciate the growing importance of this enormous item of expense. A few years since, the cost of tie renewals was but a fraction of the amount annually expended for rails, whereas to-day the figures are reversed, and the cost of ties largely exceeds the amount spent for rails, and yet no single feature of present railroad practice affords the opportunities for large reductions in expenses such as that of tie renewals. From the pages of such State Railroad Commissioner's reports as were within my reach I have culled some interesting figures, which tell their own story and point their own moral. I made no selection of years or states, but took such as were accessible during the preparation of this paper. I will not read the figures in detail, but they can be examined, if desired.

In the Michigan group, as in other states, I selected the lines showing gross earnings of a quarter of a million dollars and upwards, which I need not say includes most

lines outside of independent spurs, logging tracks, etc. The group mentioned includes such lines as the Lake Shore, Michigan Central, Northwestern, F. & P. M., C. & W. Mich., etc. In the report for 1881, the aggregate cost of ties is given as \$856,720, and for rails, \$2,237,663. Ten years later the report for 1891 shows the cost of ties to have increased to \$1,496,169, while the cost of rail had been reduced to \$975,461. From 30 per cent. of the cost of rails in 1881 the expenditure for ties had increased to 153 per cent. of the cost of rails in 1891. The Wisconsin group, including the C. & M. & St. P., the C. & N. W., Green Bay, etc., the amount for tie renewals, distributed under that head in 1879 amounted to \$349,126. The same lines reported the cost of rail renewals for the same year as being \$711,363. In 1890 ties are returned as costing \$2,167,276, the rails, \$940,494, the relative cost of ties to rail being 49 per cent. in 1879, 230 per cent. in 1890. The Kansas group includes Santa Fe, M. P., U. P., R. I., M. K. & T., K. F. S. & M., etc. The average of two years renewals, 1888 and 1889, charged tie renewals with \$1,755,250, while for rails it was only \$794,222, the cost of ties being 222 per cent. that expended for rails. The Connecticut group includes the N. Y. N. H. & H., the N. Y. & N. E., and the N. Y. P. & B. From June 30, 1888 to June 30, 1890, these lines made an average annual expenditure of \$403,314 for ties, and \$154,501 for rails, the amount expended for the former being 261 per cent. that of the latter.

These figures indicate that from aggregating one-half



New Kalamazoo Cattle Guard.

of the expense for rails in 1881, the cost of ties increased to twice the amount paid for rails in 1891. Are we not here confronted with a condition which calls for our earnest consideration, and most careful analysis? When our rails are worn out and unfit for further use in the track, we can practically exchange the old for new at the rate of about five tons for three. When ties are removed from the roadbed, they can only be disposed of at the expense of further labor for collecting, piling, burning, etc.

The \$975,461 expended for rails in 1891 by the railroads represented in the Michigan group, represents many consultations; from the consideration of the estimate to the laying of the rail, with little doubt it was made a matter of close inspection and mature deliberation, by those controlling the purse strings, no less than those in charge of maintenance. Every official, from the President of the line down to the section foreman in charge, felt the responsibility of their judicious use, and those directing or those engaged in using them were held to strict accountability. But how with the \$1,496,169 expended for tie renewals during the corresponding season?

Tell me, if you can, of any other line of business where the same amount of money is expended more loosely, and with fewer checks upon the men who have almost unrestricted disposal of material of such enormous value! The nature of tie renewals does not permit of close and constant supervision, hence the greater necessity for the institution of checks upon the section foreman who determines upon the necessity for renewals, and upon whose judgment and conscientiousness largely depends the discrimination and economy with which renewals are made. I was early impressed with the importance of this question, and as far back as 1879, I investigated this problem of tie renewals upon some 800 miles of line of which I was then in charge of the maintenance. I issued orders early in the season that all ties removed from the track should be conveniently piled and allowed to remain on the right of way until I examined them. During the season I made a hand car trip of the line, inspected every pile of ties, and found a large number which had been prematurely removed. The inspection of these ties served as object lessons to the foremen, and when their attention had been properly called to the subject in detail, and the figures of cost stated, for the first time they fully realized that two ties wasted was equivalent to the loss of a laborer's wages for the day. I called for a recount of ties to be put in for each mile of the line, and my exertions in this direction were rewarded by reducing the expense of tie renewals some 22 per cent., and 90,000 ties were left over for the succeeding year. That improper ties are not kept in the track is a matter of daily inspection; that good ties are not removed from the track requires constant vigilance and care, and I know of no better safeguard than an examination of the ties after removal, the same as indicated above. In using blank statements, it is better the material used and labor performed should not appear together. This is particularly true of ties. The

men gain an impression that as large an amount of material as possible should be shown as used for a given amount of labor. This leads to waste of material and inefficient work. The foremen were an excellent body of men, fully as watchful as the average of their class, but their attention had never been properly directed to the subject, and in the absence of careful and specific instructions and supervision they never realized the magnitude of the losses involved.

Another source of loss is frequently found in looseness of inspection, sometimes the result of carelessness, and sometimes intentional in order to keep down the increasing price of ties. Again many ties are removed from the track because of the cutting in of rails. This is particularly the case with soft wood ties. Of course it is a question of tie and traffic, and the heavy business of some lines leads to a similar failure of oak ties, particularly in yards, and on curves. The feature can be entirely corrected at moderate cost, for metal plates which will not only protect the ties from the cutting action of the rail, but when of proper form serve as improved rail fasteners, and secure great economies in labor. As to the proper form and uses of metal tie-plates, I treated the subject quite fully in a contribution to the *Railroad Gazette*, which appeared in issue of Feb. 19, 1892, to which I would respectfully refer those who desire to investigate the question further.

Let your tie estimates show the number of ties to be renewed between the respective mile posts, and classify the cause of removal, so as to indicate the number to be renewed by reason of being cut in by rail flanges, because of being spike killed, and the number to be removed because of decay. This will enable you to keep a yearly record of each mile, while a comparison of the ties with the estimate affords data for a determination of the trackman's judgment, and enables you to correct any tendency to wastefulness. The classification of causes for their removal will enable you to determine as to what devices can be economically and effectually used. The figures showing the cost of tie renewals further indicate that the subject of treated ties has with us never received the attention it deserves, and yet an abundance of experience as to methods, efficiency and cost is available for an intelligent investigation of the subject.

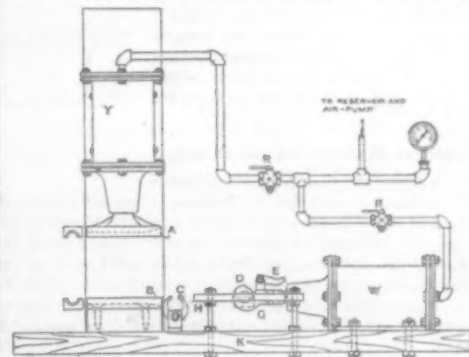
#### The Kalamazoo Surface Cattle Guard.

The engraving shows a new cattle guard brought out by the Kalamazoo Railroad Velocipede & Car Co., which is called the No. 14 Kalamazoo New Steel Surface Cattle Guard. The guard is made of plates of steel with longitudinal ribs. In the flat surfaces between the ribs sharp points are punched up, and the longitudinal ribs are placed so far apart that the foot of an animal cannot span the distance between two of them. Consequently if an animal steps on the guard its foot will slip down on to the sharp points. As the ribs are higher than these points a person falling on the guard would not be seriously injured by them.

The ends of the ribs are closed by slashing the metal and turning it over, thus providing against chains or other parts dependent from a car or truck catching against the end of the guard. It is claimed that this guard is very stiff and durable and easily placed in position, as it does not require new, or extra long ties; further, that there is an advantage in that grass and weeds cannot grow up through the guard. It is made in four sections, each 9 ft. long and 23 in. wide, and weighs 375 lbs.

#### Apparatus for Putting Air Brake Couplings in Hose.

At the Mexico shops of the Mexican Central Railway, Mr. F. W. Johnstone, Superintendent of Motive Power, uses an ingenious apparatus for forcing brake couplings

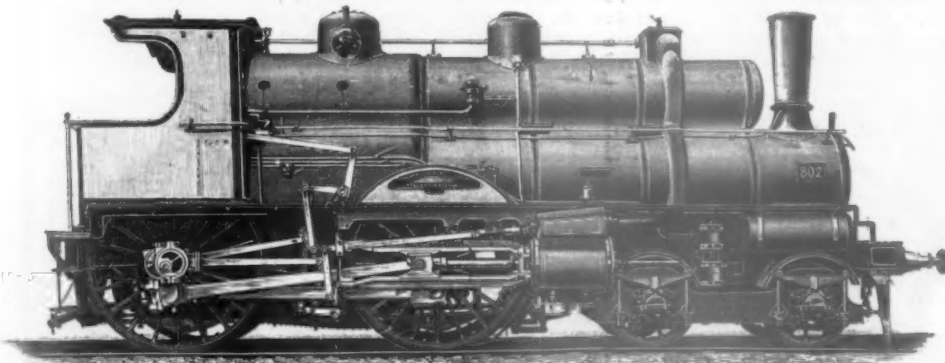


into the rubber hose. The arrangement is shown in the illustration. W and Y are ordinary brake cylinders; W is secured to a bench or suitable support, and Y is bolted to an upright bracket in such a position that the line passing through the centre of the cylinder Y intersects the line through the centre of the cylinder W. To the piston rod of W is attached a crosshead (G), working

on the guides *H*, which holds the coupling *D*. The coupling to be inserted is held in place by a dog *E* when it is thrown down into position. In operation a coupling is placed in the crosshead and the hose is clamped in the jaws *A B* by admitting air to the cylinder *Y*. The coupling is then pressed into place by admitting air into the cylinder *W*. The air is admitted and released through the valves *R*, the cylinder *F* being released first. To put on the clamp around the hose it is placed in the jaw *C*, one side of which is against the block *B*, and the other is pressed up to it by a projection on the crosshead *G*. When air is admitted to the cylinder *W* the crosshead *G* presses the clamp tight on the hose and holds it while the retaining clamp bolt is being put into place.

#### Express Locomotives, Eastern Railroad of France.

In our issue of March 4, page 170, we described the new type of express locomotive designed by Mr. L. Salomon and Mr. Flaman, of the Eastern Railroad of France, for working heavy express traffic. Since that article was published we have received English technical journals



Express Engine—Eastern Railroad of France.

giving illustrations of this locomotive and some further details. The view which we reproduce is from the *Railway Engineer*, but *The Engineer*, in its issue of March 4, illustrates the locomotive somewhat more completely and gives a pretty detailed description of it, and states the considerations which led to the design. We add a few particulars to those which we have already published.

It appears that 12 of these locomotives have been built at the Eprenay works of the Eastern Railroad, and are now running. The requirements in designing them were that they should be able to take trains of 600 tons up long gradients of 42 ft. a mile at 12½ miles an hour; trains of 220 tons at an average speed of 47½ miles an hour; trains of 140 tons at an average speed of 56 miles an hour. The last requirement has been fulfilled in runs between Paris and Chalons, where there are continuous gradients of 16 ft. a mile and short ones of 32 ft. The engines weigh 123,086 lbs. in working order, of which weight 72,175 lbs. is carried on the drivers.

It will be observed that the cylinders are set about midway of the length of the engine. This is done on the theory that here the thrust and pull have the least disturbing effect at high speed. The result, of course, is connecting to the rear drivers, and in order to get the rear axle back of the firebox the coupling rods are 9 ft. 9 in. long. It appears that the boiler pressure is to be limited to 156 lbs., "because there are not infrequent cases of the injector working irregularly at the higher pressures of 170 and 180 lbs.," and further to keep down the weight of the engine by using comparatively thin sheets. The sheets of the boiler proper are ½ in., and of the upper barrel ¾ in.

#### Proposed Standard Centre Plates.

The committee appointed by the Master Car Builders' Association to propose standard centre plates and stake pockets have issued a circular illustrating proposed designs of interchangeable pressed steel, malleable iron and cast iron centre plates and four types of stake pockets, asking for replies from the members with suggestions and opinions on the designs. The following is the text of the circular relative to centre plates:

"The committee has thought it desirable in recommending a standard centre plate to establish a diameter of an even number of inches at some point on the centre plate, and it proposes 8 in. as the inside diameter of the truck centre plate at the top, on a line 1½ in. from the inside face of the bottom of the plate.

"In the accompanying cut, fig. 5, all principal dimensions are given, including the location of the bolt holes,

The plates are all 14 in. long; the truck centre plate is 11½ in. wide; the body centre plate for iron bolsters 8 in. wide, with the holes 4½ in. centres. The body centre plate for wooden bolsters is 12 in., with holes 6 in. centres.

"Please say whether you will favor this centre plate in form and size, and, if not, what have you to recommend as a standard?

"Fig. 6 shows a design for malleable iron centre plates which are interchangeable with the pressed steel ones. Please say if you will favor this as a standard for malleable iron centre plates?

"Please address replies to the Chairman at Aurora, Ill., before April 15, 1892.

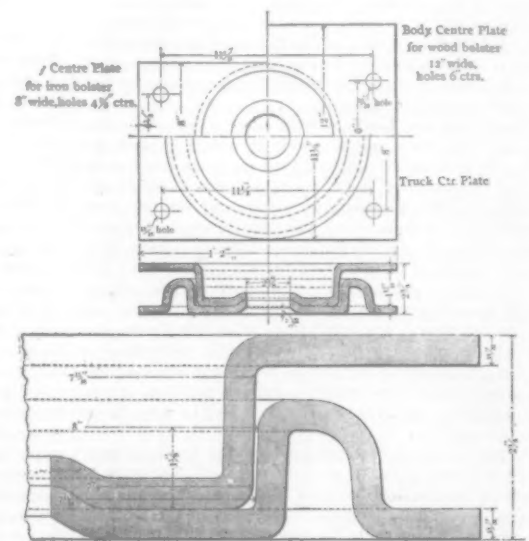
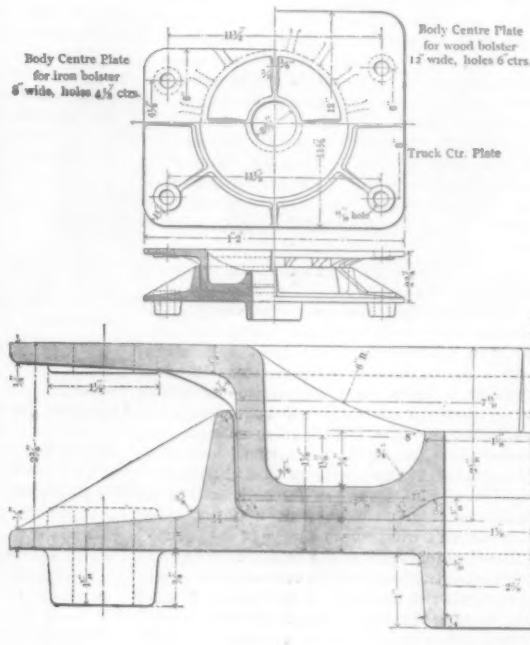
"Wm. Forsyth, Chairman,  
"John Mackenzie,  
"E. D. Bronner, } Committee."

#### Shop Notes, Mexican Central Railway.

At the Mexico shops of the Mexican Central Railway there is a well arranged system for distributing power by steam from a central boiler plant. One large engine

furnishes power to the engine shops and saw mill which adjoin. The cylinders from an old locomotive have been utilized to make a compound engine to furnish the power for the blacksmith shops, the left hand cylinder being bushed to six in. diameter for high pressure. The cylinders are mounted on frames and the valves worked from a rocker as on a locomotive.

Two large wheel lathes are placed outside of the shops, and are driven by a small vertical engine bolted to one of the corner posts that support the roof over one of



Standard Centre Plates Proposed by the M. C. B. Committee.

the lathes. The other lathe is not covered, for in the dry season much of the work can be and is done outside. It is pleasanter outside than inside, and a number of trees have been planted near the shops which will soon furnish a protection from the sun so that the men will prefer to do all their work outside in the warm climate. All that is really needed for shops is a roof, for protection from the sun and rain. Some of the shops are built on this plan. Their foundations are cast iron car wheels, one being placed under each post that supports the roof, the end of the roof post being turned to fit the axle hole in the wheel. Sometimes these wheels are placed on the surface of the ground, and again they form the coping for masonry foundation.

A drop for breaking old castings is similarly supported by car wheels, there being three old rails bolted together

at the top to form a support for a pulley block by which the weight is raised. To the lower ends of the rails, which, of course, are placed vertically, are bolted suitable castings which enter the holes in the wheels. A small engine near the drop furnishes the power. This makes a neat arrangement and one quite in contrast with the rickety death-traps found about some shops in the United States.

The water for these shops is supplied from a tank which is supported by a circle of masonry about 20 ft. high. The masonry is hollow, and until recently the space inside was unoccupied, but by the ingenuity of the master mechanic, Mr. Jennings, it has been turned into a well regulated bath room for the use of the motive power department.

#### The Largest Refrigerating Machine in the World.

The De La Vergne Refrigerating Machine Co. exhibited on Saturday last at its shops at the foot of 138th street, New York City, the largest refrigerating machine that it has yet built. It is claimed to be and probably is the largest machine of its kind in the world. Its rated daily capacity for refrigeration at a 40-revolution speed of crank shaft is equal to the cooling work accomplished by the melting of 500 tons of ice in 24 hours.

The operating engine is a cross compound of the Corliss type, with condenser attached, developing 600 H. P. The cylinders are 32 and 64 in. diameter by 84 in. stroke. Two fly wheels are used, each 14 ft. and 8 in. in diameter. The two compression cylinders are double acting and are 24 in. diameter and 48 in. stroke. The machine, when in full running order, covers a floor space of 37 ft. and 4 in. by 22 ft. and 3 in. The height is 28 ft. and 6 in. The finished weight of the crank shaft is 20,820 lbs. The connecting rods operating the compressors weigh 3,400 lbs. each; the engine rods weigh 3,800 lbs. each. Phosphor-bronze is used throughout for the bearings. The finished weight of the complete machine is about 350,000 lbs.

The machine is now completely connected in the shops of the company, every part, pipe and connection being in place with the exception of the two fly wheels. This the De La Vergne Co. is in the habit of doing with all its machines from the largest to the smallest. Every detail is fitted and marked, and when shipped to its destination the machine is ready for speedy and reliable erection and operation. The machines are adapted to every ice making and cooling purpose, whether minimum or maximum in its demands. They can be economically used in the largest packing and brewing establishments, in hospitals, steamships, theatres, hotels, markets, preserving houses—in fact everywhere where ice or ice products have to be made, or where cold is desired for preserving or cooling purposes. The machines will bear close inspection by the most critical eye

in every detail of construction and workmanship. The nature of the apparatus and the work required of the completed machine render it absolutely necessary that each part of the apparatus from the smallest and most insignificant to the largest and most necessary shall be of the best material for the purpose, and made with the best skill and care.

Mr. De La Vergne, the President of the Company, has been the practical pioneer in the construction and use of refrigerating, cooling and freezing apparatus, and deserves praise for his persistence and determination in the development, and for the care and watchfulness with which every machine has been constructed from the first experimental apparatus applied at the Hermann Brewery in 1878 down to this last monumental one of 500 ton per day capacity.

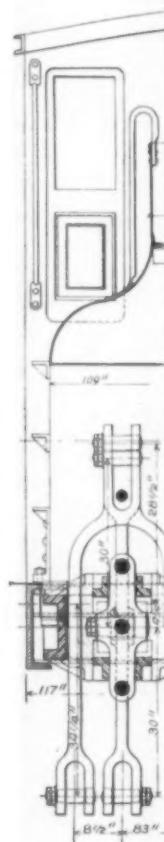
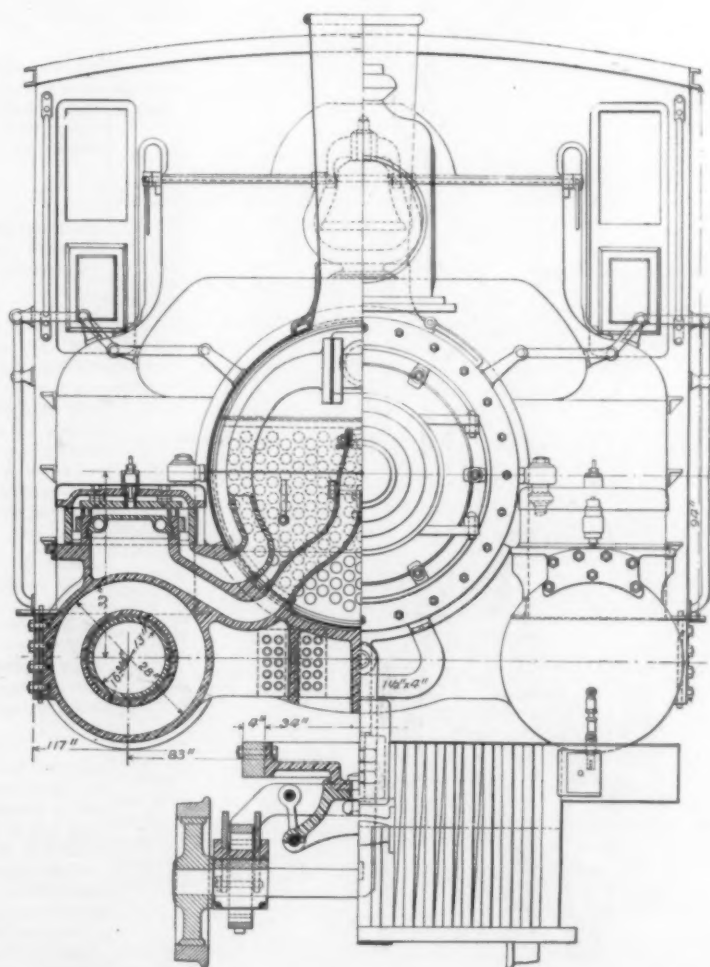
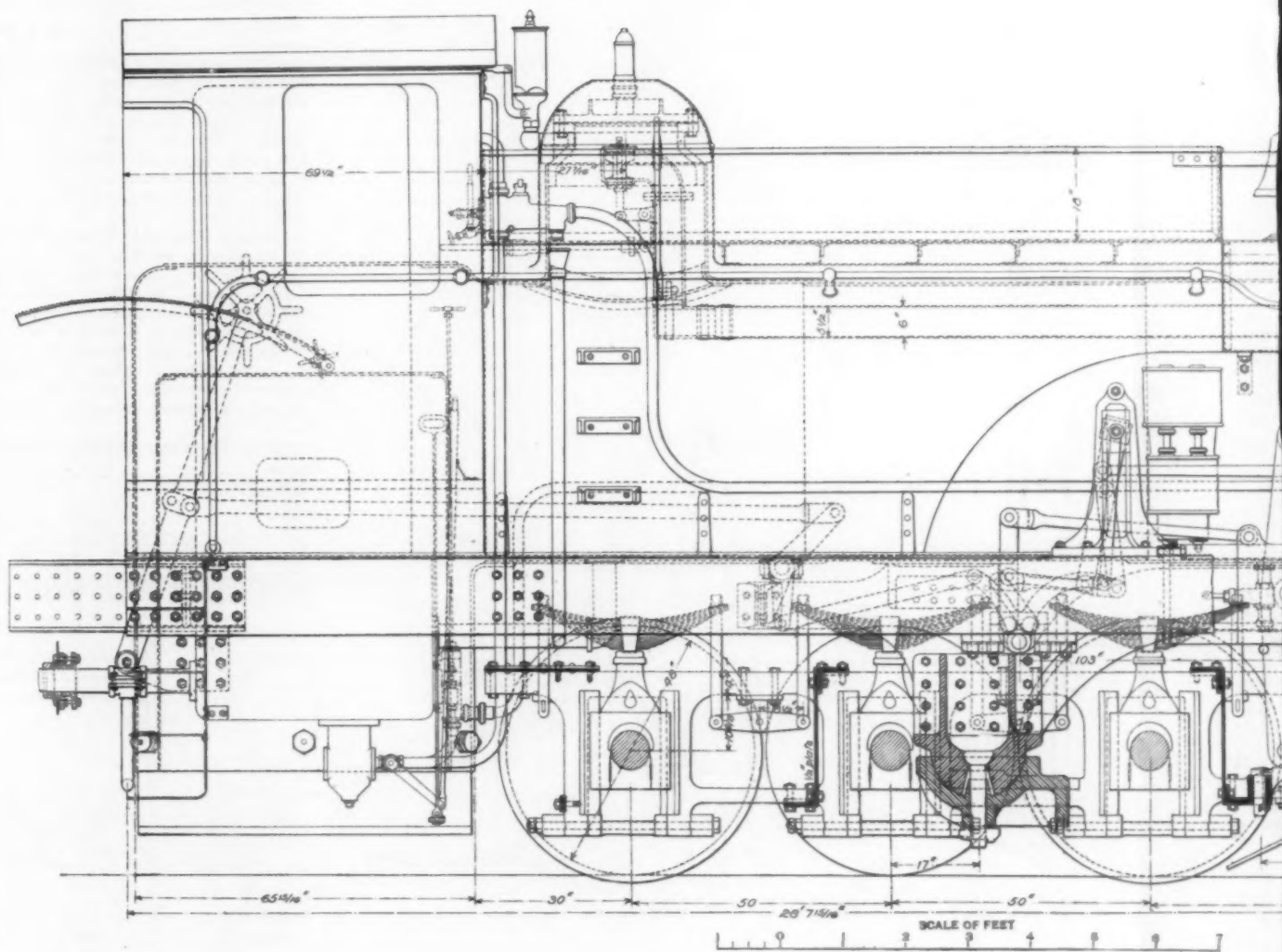


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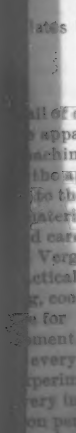
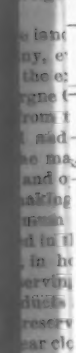
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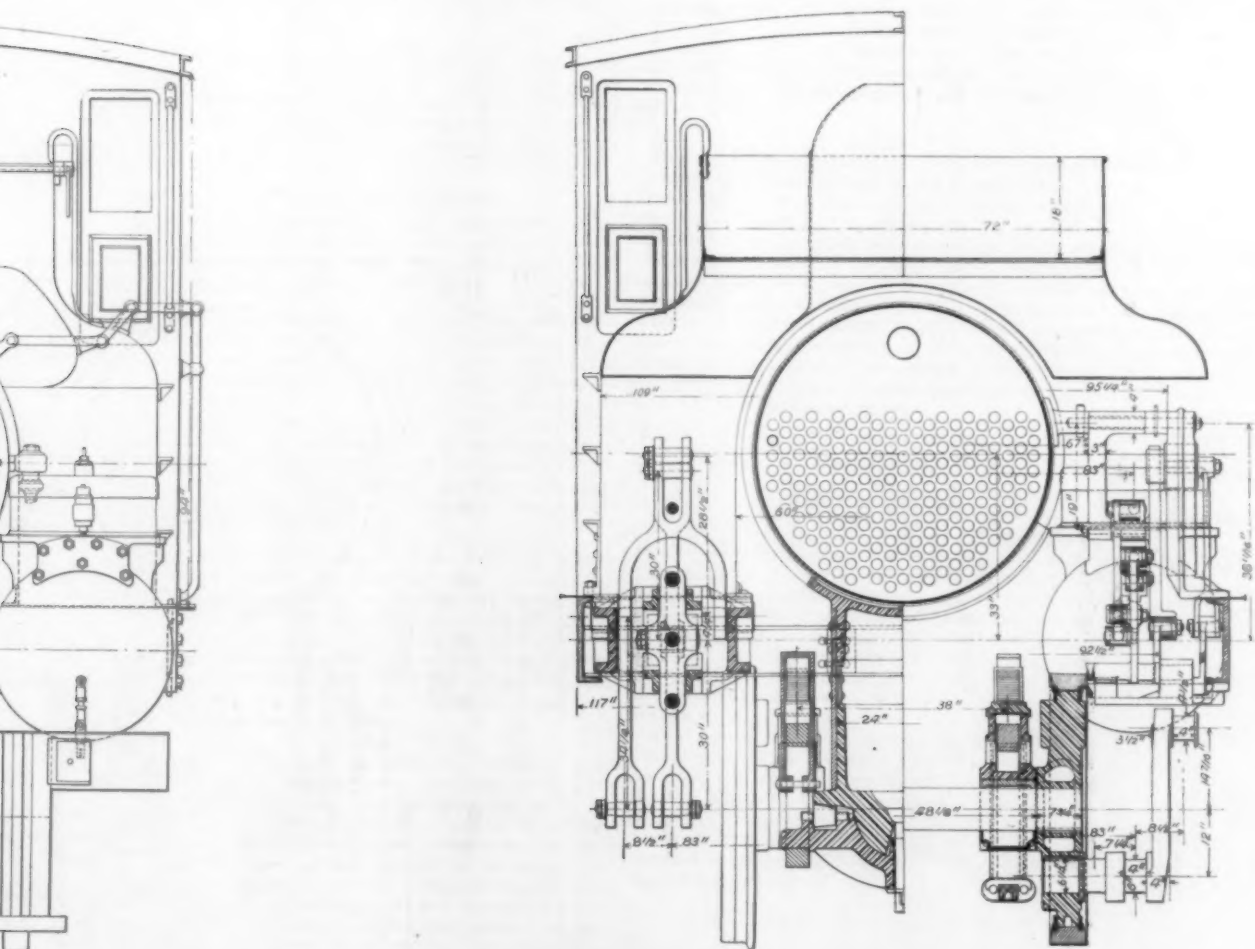
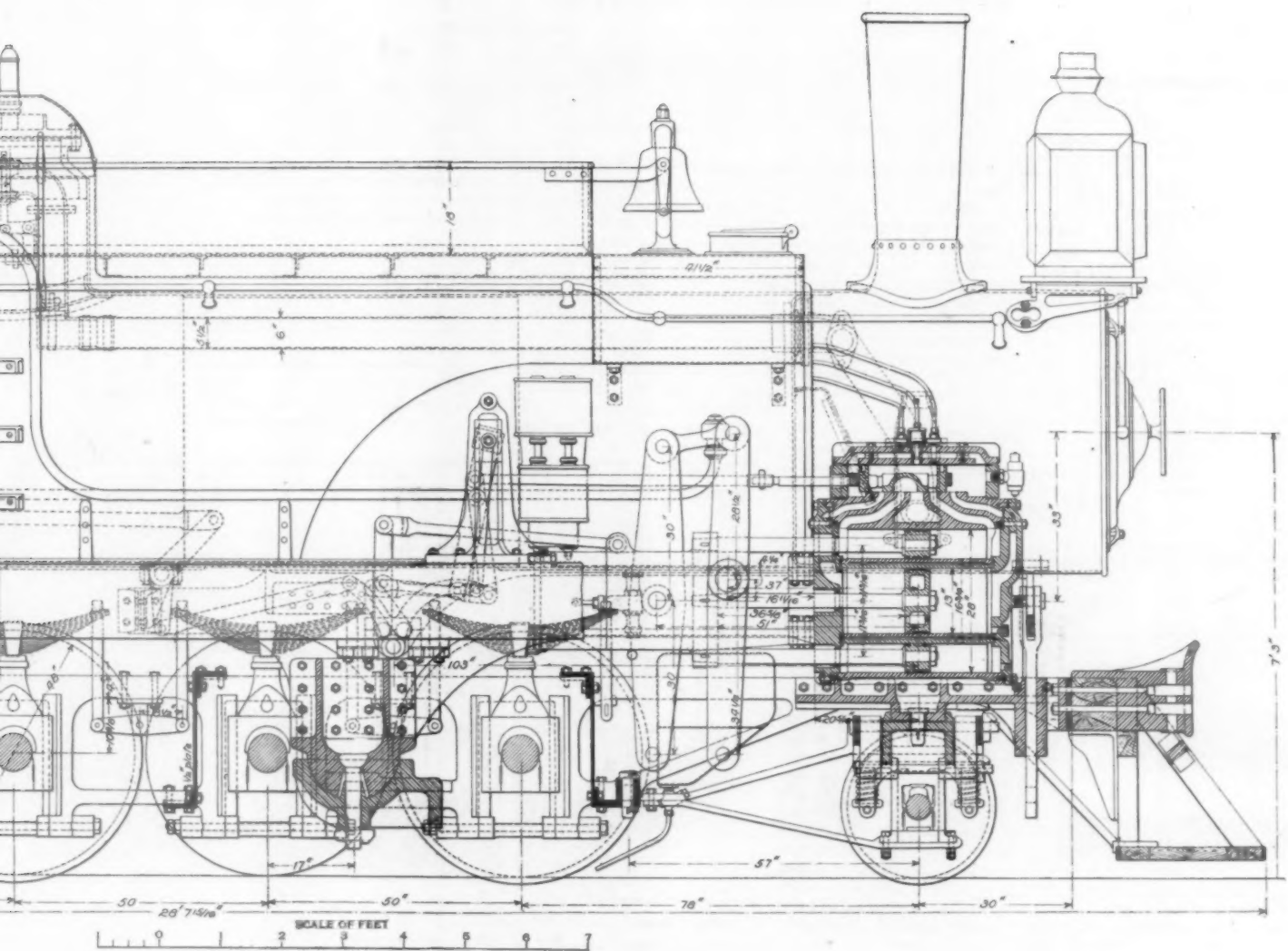


DOUBLE BOGIE COMPOUND LOCOMOTIVE—MEXICAN CENTRAL RAILWAY  
Designed by Mr. F. W. JOHNSTONE, Superintendent Motive Power and Machinery



DOUBLE  
*Designed*





DOUBLE BOGIE COMPOUND LOCOMOTIVE—MEXICAN CENTRAL RAILWAY.

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Iron Ash Pits.

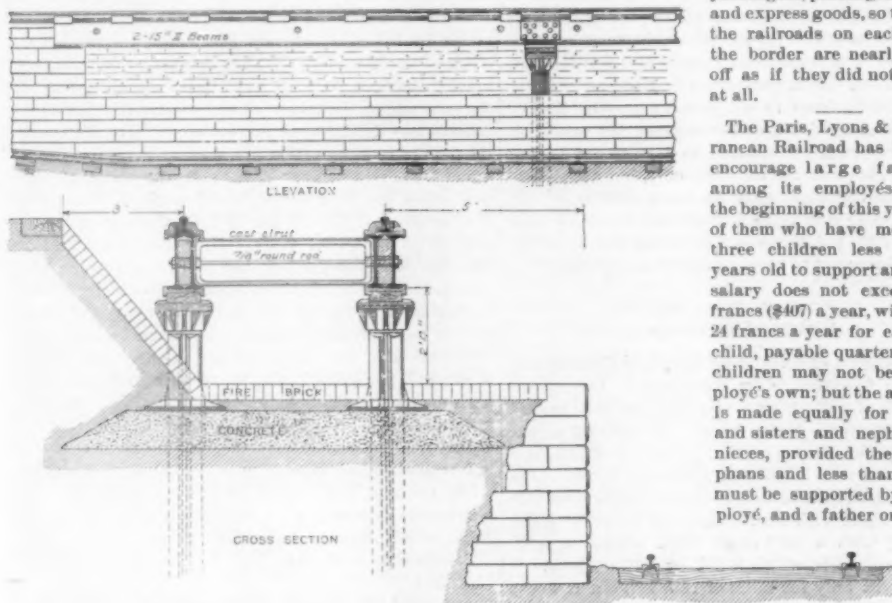
The Iron Substructure Co., of Columbus, O., has a specialty of cast iron piles, driven like timber piles, with proper provision for capping, lateral bracing, etc. With these piles a so-called "ground plate" is used in very soft ground to take a part of the weight. This plate is keyed to the pile at any desired height. The application of these piles is chiefly to bridge substructure, and they have been quite extensively used for country bridges in Ohio.

The illustration shows an application of these piles in supporting the track over ash pits for railroad use on the Baltimore & Ohio at Newark, O., and South Chicago, Ill. It will be seen that the rails are carried on I-beam girders, connected by suitable struts and rods, and that this structure is carried on iron piles with the ground plate resting on concrete. Where the supporting power of the driven piles is sufficient the ground plate and concrete would not be used. Oak blocks are shown on the pile caps; these give elasticity and a means of

of the purchasers, and that, finally, it is desirable for the passenger to have but a single porter to deal with. Thereupon the Minister decided that the railroad porters have the right to carry baggage to the passengers' domiciles, and to bring it to the stations from them.

Before the expiration, Feb. 1, of the commercial treaty between France and Spain, which is followed by tariffs which are expected almost to prohibit the importation of some of the chief articles interchanged, the connecting railroads had an enormous traffic. The two Spanish lines which connect with France (one on each coast) kept 12,000 cars constantly busy in the international traffic. In December and January the one on the Atlantic side brought over the French border more than 2,000,000 gallons of Spanish wine, and half an hour before the treaty expired 800 cars loaded with champagne and vichy water passed over into Spain on the Mediterranean side. The last of the through freight tariffs between France and Spain on this line (on French coal to Barcelona) has been withdrawn, and also through rates on passengers, passenger baggage and express goods, so that now the railroads on each side of the border are nearly as well off as if they did not connect at all.

The Paris, Lyons & Mediterranean Railroad has begun to encourage large families among its employes. From the beginning of this year those of them who have more than three children less than 16 years old to support and whose salary does not exceed 2,100 francs (\$407) a year, will receive 24 francs a year for each such child, payable quarterly. The children may not be the employe's own; but the allowance is made equally for brothers and sisters and nephews and nieces, provided they are orphans and less than 16, and must be supported by the employe, and a father or mother,



ASH PITS ON THE BALTIMORE & OHIO.

Iron Work by the IRON SUBSTRUCTURE COMPANY, Columbus, Ohio.

adjustment of the level of the girders. The rails are held in chairs, with wooden keys. The pit itself is lined with firebrick, with a suitable masonry retaining wall on the side toward the track by which the ashes are carried away. The whole construction is very substantial.

Foreign Railroad Notes.

The Northern Railroad of France has substituted the telephone for the telegraph in working several branches with light traffic. The result, after several months' experience, is said to have been satisfactory.

Since 1880 the French railroad companies have given their own and each others' employes tickets over their lines at one-fourth of the regular rates, and to their parents, wives and children, while living with said employes, at half rates. Now they have decided to give each employe a free passage yearly over one or several companies' lines, and to members of his family tickets at one-fourth of the regular rates. Moreover, those living within 18½ miles of Paris are to get quarterly, half-yearly or annual commutation tickets at one-fourth of the regular commutation rates.

It is noticeable that in spite of the failure of the harvests last summer, the Russian railroad carried more freight last October than in the corresponding month of last year, and their increase in earnings was 5½ per cent. The increase was at a greater rate in October than in the previous nine months of the year, when earnings increased less than 5 per cent. The earnings per mile for the ten months were the largest for many years, with a single exception (1888).

At an Austrian watering place the station baggage porters sometimes carried passengers' baggage from the train not only to the cars or outside platform of the station, but also to the hotels or residences of the passengers. Thereupon the porters licensed by the town complained that this was contrary to the ordinances; the first authority found their complaint justified and fined the railroad porters; on the first appeal this finding was confirmed; but on the final appeal, which was to the Minister of the Interior, the railroad authorities made the plea that the legal railroad regulations expressly authorize the railroads to deliver to domicile by their own servants not only passengers' baggage but freight; that in so doing they no more violated the law than the merchant who delivers goods at the residences

father-in-law or mother-in-law supported by an employe and living with him constantly counts also as a child. This applies only to the regularly appointed, permanent employes, not to those engaged by the day (perhaps one-half the force), who may be dismissed at any time.

To what details official regulation of railroads can go is shown by a recent circular of the French Minister of Public Works, which relates to the sweeping of station platforms. This should be done, says the circular, at times when the intervals between trains are longest, and conducted with the requisite caution, so that passengers may not be incommoded by the dust which the sweeping raises in summer. For this purpose in dry weather the platform should be sprinkled, and windows and curtains of cars standing in the station should be closed. As far as possible, the sweepings should be carried out of the station, and not be swept upon the track, as is customary in some stations.

TECHNICAL.

Masonry at Low Temperatures.

Speaking of masonry work in very cold weather, the *Deutsche Bauzeitung* says that at Christiania, in Norway, building operations are satisfactorily carried on with the temperature ranging as low as from 18° F. to 2° F., and that the work executed at these temperatures compares favorably in every way with work done in summer. In fact it is maintained by Christiania builders that carefully carried out winter work is even superior to summer work. The secret of successful work at the low temperatures is said to be in the use of un-slacked lime in mixing the mortar, small quantities at a time being made up immediately before use. The mortar must be quickly used up before it has time to lose the heat generated by the slacking of the lime. The lower the temperature at which work is to be done the larger must be the quantity of lime employed, so that, it is stated, at temperatures below 12° F. work cannot be carried on profitably.

The Master Mechanics' Compound.

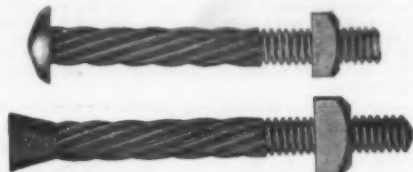
The ten wheel Baldwin compound, built for the Master Mechanics' Committee, has been delivered to the Burlington road for experiment. It was tried on the Illinois lines last week, and on the Iowa lines this week. The test is being made under the direction of Mr. William Forsyth, Mechanical Engineer of the road.

Strength of "Turpentine" Timber.

There is a general objection to the use of timber made from such trees of the long leaf pine as have been "boxed" or chipped for turpentine, as it is thought that the loss of the resin, extending as it does through four years, weakens the timber and impairs its durability. The timber annually affected by gathering turpentine is estimated by Mr. Fernow, the chief of the Forestry Division of the Department of Agriculture, as fully 1,000,000,000 ft. B. M. Prof. J. B. Johnson, of Washington University, St. Louis, has been making an extensive series of tests of the strength of timber, results of which we have published before. Incidentally he has tested the value of the prejudice against "boxed" timber. The experiments have not yet been carried far enough to fully determine the point, but Mr. Fernow feels justified in indorsing and publishing the conclusion from the results of the experiments already made that "turpentine" timber seems to possess greater strength than timber from unboxed trees. This general statement is modified in the concluding part of the circular, where it is said that "turpentine" timber exhibits less tensile and shearing strength, but is stiffer than that from unboxed trees, and has greater compressive and cross breaking strength." Attention is called in the circular to the fact that this conclusion should not receive full acceptance until further verification. The experiments are now suspended, unfortunately, through lack of funds.

A New Style of Button Head and Countersunk Bolt.

There is a class of bolt used to some extent around machine shops and in railroad repair shops that gives no end of trouble by reason of the turning of the bolt when the nuts are taken off or put on. This is particularly



true of such bolts as are used in locomotive cabs and running boards. A new design of bolts has just been put on the market by the Russell & Erwin Manufacturing Company, New Britain, Conn., in which this difficulty is removed by making the bolt with a spiral corrugated shank or body. In use the hole in the wood-work is drilled slightly smaller than the body of the bolt, and the bolt is driven in with a hammer. The corrugations find a seat in the wood and absolutely prevent the bolt from turning while the nut is being put on or taken off. There is no difficulty in removing the bolt at any time, and when replaced it will still be tight.

The Chicago Main Drainage Letting.

The sixteen miles, mostly rock work, of this canal between Willow Springs and Lockport is now virtually located and the general form of the specifications is decided on. The elevation of the bottom of the canal at Willow Springs will be 23 ft. below the Chicago datum and thence the grade will fall to Lockport at the rate of .082 of a foot per 1,000 ft., to an elevation of 30 ft. at Lockport. The minimum width is to be 100 ft. in rock. The specifications will require the contractor to do all the work and furnish all materials, tools, explosives, labor and appliances necessary. No subletting will be allowed under penalty of forfeiture, and only American labor is to be employed! The contract will also cover changing 11 miles of the Santa Fé railroad's track. The chief engineer has absolute power to settle all questions not covered by the contract. The excavated rock, nearly all of which is valuable for building purposes, is to be the property of the contractor. The law requires two months' advertisements of the contract, so it will be about the first of June before the contract will be awarded.

Duluth & Iron Range Ore Docks at Two Harbors, Minn.

The piling for these docks has all been driven and the work of the superstructure is well under way; bents for 50 pockets—25 on each side—are already in place. The dimensions of the dock are: Length beyond approach, 504 ft., width, 54 ft., height, 51½ ft. above water. There are 84 pockets, each having a capacity of 180 tons. The arrangement of traps for filling the pockets and the tracks serving them is a novel one, designed by Mr. J. L. L. Greetsinger, General Manager of the Duluth & Iron Range road. Two tracks are made to serve three traps in each pocket. This is accomplished by laying the inside rails of the of the tracks to standard gauge, making a third track, to be used in filling the pockets to their fullest capacity. Three-throw, split switches, made by the Wier Frog Co., are located on the dock approach for operating these tracks. T. H. Mathews, of St. Paul, is the general contractor for the work, and the Duluth Manufacturing Co. has the contract for the iron work. The docks and shops are to be lighted by means of an electric light plant to be furnished by the Thomson-Houston Electric Co. This plant consists of a composite wound alternating current dynamo of 500 incandescent light capacity, and a 50-light arc dynamo, each complete. The power for operating the dynamos will be furnished by an engine made by the Ideal Mfg. Co., of Springfield, Ill.



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## EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The Erie now operates 278 miles of single track road, in one continuous stretch, under the block system, the New York, Pennsylvania & Ohio, from Salamanca to Galion, having been worked on this plan since February 28. This is doubtless the longest single track line in the country thus worked. The officers of the road express great satisfaction with their experience on the third division during the last eight months and expect soon to extend the system over the Chicago & Erie road. There has not been the slightest accident that the system could or should have prevented. A chief element in the satisfaction felt by both officers and trainmen seems to be the sense of security against butting collisions, which the blocking affords. This is especially worthy of note, for the reason that protection against rear collisions has always been the principal if not the only ground on which the space-interval system has been advocated. As going to disprove the theory, held by some experienced men, that the ordinary (time-interval) system had better be continued unless the facilities are sufficient to admit of absolute blocking for all trains, it may be stated that the officers of the Erie testify to an improvement in the time made by trains under their rules. The block stations are in some cases three or four miles apart, and it is therefore necessary to run freight trains under permissive signals much of the time, but the average time of trains has actually been improved, and the capacity of the road thereby increased. The three-position semaphore, and the safety lever for preventing an operator receiving a train order except when his signal is at danger, which Superintendent Mozier devised when he established the block rules on the Third Division of this road, and which are used at all the block stations, are also highly spoken of by the men using them.

Official gravity and decorum must be seriously taxed at the hearings before the Senate and House committees on the matter of car coupler legislation. Since the days when the augurs looked grave over the chicken's bowels and went behind the oak trees to snicker, few men have had a harder time keeping their faces than these committeemen have. They must listen solemnly to lawyers who know no law, and mechanics who couldn't make a boot jack, and professional friends of humanity, and incapables who hang on to the skirts of official life, while these people attempt to express their muddled notions on a complicated question of social science and applied mechanics. Certainly some of the committeemen have a sense of humor, but they all seem to feel bound to take the matter seriously. Perhaps they are; but it is not supposable that all of the opinions and facts offered are treated by the committees with equal consideration. For instance, in the recent hearing before the Senate committee, one man, a petty officeholder in Washington, assumed to speak for "the people," and supported his bill for a coupler commission by downright misstatements. He said, for example, that the Minneapolis, St. Paul & Sault Ste. Marie had equipped

all of its cars with the M. C. B. coupler, and then "discarded the couplers, and they are now out of use."

Every one of them has been taken off and piled up as old iron." This, he said, is the way in which the estimate has been reached that 30,000 M. C. B. couplers are going into use a month,—they are sold by the makers but scrapped by the purchasers. A senator asked, "Is the committee to understand that the railroads of this country are purchasing 30,000 of these couplers a month to be piled up as old iron?" "Yes, sir," was the reply, "some of them are doing it." We have not noticed where this figure, 30,000, came from, or who made such an estimate, but that is immaterial for the moment; the point is the absurdity and absolute untruth of the story about the Sault Ste. Marie road. The truth seems to be pretty nearly this: That road equipped about 300 of its cars with the M. C. B. coupler, these are ore cars and now laid up for the winter. There is no more chance of taking off the couplers than of burning up the cars. This one specimen is enough to discredit all of the statements and arguments of the person who told such reckless yarns. Yet he is permitted to gravely assure the committee that the case is prejudiced by the money interest of railroad officers in couplers, to present alleged statistics of casualties and to elaborate his crude notions of a national commission to lead us out of our troubles. This was an extreme case, but about two-thirds of the testimony that we have read is of but very little more value. In a later issue we shall take up a few of the points made, but meanwhile we advise the committees not to take seriously everything that is told them.

## Richmond Terminal.

The Richmond & West Point Terminal Railway and Warehouse Company is an organization formed for the purpose of controlling a very large railroad system with comparatively little money, by securing a bare majority of the shares of the companies which it is desired to control. It owns no railroad whatever, only the stocks and bonds of companies which do own railroads. It began with the Richmond & Danville itself, controlling with a very small stock capital a large system of railroads, which it did by leasing them. It actually owns only 180 miles of railroad, but it works at this time 3,320 miles; a large part of which, however, has been leased—since the Terminal Company acquired control of it. Later the Terminal Company issued its own securities for a controlling interest in the East Tennessee, Virginia & Georgia, and then issued the latter's bonds to acquire an interest in the Cincinnati, New Orleans & Texas Pacific. Again it acquired a company similar in nature to itself, the "Georgia Company," which owned \$4,000,000 of the \$7,500,000 of bonds of the Central Railroad & Banking Co., of Georgia, which itself owns a little more than 300 miles of railroad, and leases or otherwise controls about 2,600 miles.

Thus the Terminal Company has an immense property in stocks, which would increase greatly in value if the properties controlled increased moderately in profitability; for all the increase in profits would go to the stocks, and hitherto most of the stocks it holds have received but small dividends or none at all. But the converse also is true; a comparatively small decrease in profits leaves such a company with a very small income; for under ordinary circumstances, perhaps nine-tenths of the net earnings of the roads controlled is absorbed by their fixed charges. By its very nature such a company is in the highest degree speculative, liable to immense fluctuations in profits, and the risks to which it is subjected are immensely increased when, as in this case, bonds are issued to pay for a very large part of the stock acquired. To illustrate: a railroad system which earns \$1,000,000 net yearly and has \$900,000 of fixed charges can pay five per cent. on \$2,000,000 of stock. If net earnings increase only 10 per cent., it can increase its dividends 100 per cent., if net earnings decrease 10 per cent. it has no profits to divide, but still is solvent. If now some one buys this stock and issues \$1,000,000 of 5 per cent. bonds to pay for half of it, any decrease of more than 5 per cent. in net earnings will make its income less than the interest on its bonds.

The Richmond Terminal Co. has not turned out well. Among its later acquisitions were some unprofitable properties, especially the Georgia Pacific, which last year did not earn its working expenses not to say its fixed charges. The dividend due as rental of the Central of Georgia was not paid when last due, and more defaults were evidently impending, when a committee of prominent bankers, etc., was called in, like a consultation of financial doctors, to propose a remedy for the case. They have now reported, and their prescription is, substantially: to cure the debtor, bleed the

creditors. There is little doubt that this will succeed—if the creditors submit to be bled.

The committee's report recommends the fusing of all the properties controlled, including, perhaps, a hundred different companies, into a single corporation, with a capital of \$110,000,000 common stock, \$70,000,000 5 per cent. preferred stock and \$170,000,000 first-mortgage 4 per cent. bonds.

When it is remembered that the Terminal Company has never owned more than a comparatively small fraction of the value of the securities of the railroads which it controls, it seems strange that its embarrassments should be made the occasion of amalgamating such a great variety of interests, whose securities vary immensely with the properties on which they are issued and their relative rank. Still stranger is it, that for the best secured bonds of the old companies, and which naturally are held by the most conservative investors, it is proposed to issue their assumed equivalent partly in the stock of the proposed new company.

We have attempted to ascertain what valuation is placed by the committee on the bonds and preferred stock of the new company; but the result of our examination has been only to show that their valuation of the outstanding securities of the present companies is ridiculously unlike their market price. For instance, the plan of reorganization proposed to give for Richmond & Danville 6 per cent. debentures, 120 of the new bonds and 30 of the preferred stock; for Atlanta & Charlotte Air Line 7s, due 1907, it offers 120 in bonds and 40 in preferred stock. Now the Richmond & Danville debentures sell on the market at 93; the Air Line 7s at 120; the committee estimates the latter worth more than the former by just 10 per cent. of their face in new preferred stock; the market makes the difference \$27; this would make the preferred stock worth \$270 per share! But if we continue our comparisons we shall get some queer equations; this for instance:

By plan:

Terminal collateral trust 6s = 120 bonds + 40 stock;  
but Air Line 7s of 1897 = 120 bonds + 40 stock;  
therefore Terminal 6s = Air Line 7s of 1907.

Now, substituting market values, we have:

Terminal 6s = 93; Air Line 7s = 120; therefore 96 = 120!

That a bond like those of the Terminal Co., which has no security but the profits of a speculation which has been shown to be unprofitable, should be put upon a par with bonds secured by properties which are really profitable seems strange financiering, and of a kind likely to make investors more than ever distrustful of American railroad securities.

Generally the differences in the valuations of securities for exchange are unlike, and often very much unlike the differences in the market prices. A bond which sells for 106 would receive more by the plan than one which sells for 120. Georgia Pacific first 6s, secured by a railroad which last year did not earn its working expenses, are allotted 110 in bonds and 50 in preferred stock, and Terminal preferred stock, in its nature highly speculative and dependent entirely for income on dividends from other railroad stocks, is offered 100 in bonds and 20 in preferred stock. It sells on the market for about 65. East Tennessee first preferred stock also receives some bonds in exchange. These facts make it hard to understand the generally favorable reception which the plan has received from the press. Perhaps it is due to the very great difficulty of analyzing it, owing to the number of securities involved and the very great differences in their relative security and consequent value. "Wall street" favors almost any settlement, because it fears the effect on the market of the collapse of the Terminal Company.

## Standard Tests for Car Couplers.

Those who have read the paper on a set of proposed tests of car couplers by Mr. William Forsyth before the Western Railway Club cannot fail to be impressed with the importance of the subject. He has shown that a malleable iron coupler as ordinarily furnished is not as strong as is needed to stand the service to which couplers are subjected, and that it will be necessary to pay more strict attention to the material used in vertical plane couplers in the future, to the extent, if necessary, of changing to cast steel in the place of malleable iron.

Almost any one reading the paper would feel that malleable iron is unsuitable for car couplers; and while such a conclusion might be justified by the nature of the average material now furnished, it is not a safe conclusion to make in general. Malleable iron can be made to-day just as good as it ever could be made, and probably better. There are as many grades of malleable iron as of cast iron. Cast iron can be made that will have a tensile strength as high as 35,000 lbs. per square



inch, or as low as 10,000 lbs. Malleable iron, so-called, is now generally made varying from 20,000 to 35,000 tensile strength. Several hand-books on the strength of materials give the strength of malleable iron from 40,000 to 50,000 lbs. per square inch. Such data are based upon, not the ordinary malleable iron, but the superior quality that is used in making agricultural tools, cutlery, etc. The character of malleable iron depends more upon the materials used in making it, than upon the process. We have seen malleable iron that could be welded and twisted almost like wrought iron, but this is not the material that has generally been put into car couplers. Some of the first couplers made were of this material, and from actual experience we know that under a steam hammer they could be bent and twisted much like ordinary wrought iron. Therefore, it is well to remember that malleable iron can be a very good and serviceable material even for car couplers, provided it is properly made, of the best material.

The substitution of steel for malleable iron will not remedy the difficulty unless as much care is taken in the selection of the steel as is now necessary in the selection of malleable iron. The variation in the strength of steel is even greater than the variation in the strength of malleable iron with the additional uncertainty of hardness and porosity. Malleable iron as a rule makes solid castings; steel does not. Malleable iron is seldom hard and brittle; cast steel is frequently so. Some of the materials that are now being sold for cast steel are, in fact, nothing but a superior quality of annealed cast iron, and cannot be rightfully called steel, not even by the broadest construction of the word. Such material throws as much discredit upon steel castings as the ordinary low grade of annealed cast iron does upon what is properly malleable iron. So as it now stands, the introduction of cast steel will not help the coupler question unless a rigid inspection is followed; and as such inspection would materially and quickly affect the quality of malleable iron produced, the first thing to be done is to establish a system of inspecting car couplers which will determine the material of which they are made.

To test the material of a car coupler is no easy matter, as those who have tried it have learned to their sorrow. The material may be good in one part of the coupler and not good in another. There may be cracks and defects, and while a piece taken from the shank may show a high tensile strength and ductility in the pulling machine, yet the lugs and guard arms may be so inferior as to be unfit for use. The only way to make a test that is at all conclusive is to operate upon a full sized coupler under something which approaches service conditions. If the coupler is mounted on wood-work and springs, as has been proposed by some, then the damage to the mountings and the uncertainties as to the conditions of the tests will be too great to make a fair comparison between different designs. Therefore, whatever plan is adopted, it should be such that the standard conditions can be reproduced readily. The plan which Mr. Forsyth has proposed, of placing a heavy cast iron block under the coupler, does not give the conditions in which a coupler is used in service, but it has the advantage of being readily arranged by any railroad company having an axle drop, and it is just as fair for one coupler as another; and the essential condition of service, namely, the point of application of the blow, can be reproduced exactly. So far as tests have been made in this way they appear to have shown the comparative values of the different couplers tested, and the strongest and best material has given the best results. Hence, we think that the plan as proposed, with perhaps some slight modifications after a more thorough discussion of it, is worthy of adoption and should receive the earnest support, not only of railroad companies but of coupler makers. There is probably no subject more deserving of the attention of the Master Car Builders' Association this year, as a standard set of tests will make possible the maintenance of a practically uniform quality of material in the vertical plane coupler.

#### Northwestern Lumber Traffic.

It was a reporter for the census of 1880, we believe, who, presenting the results of his investigation of the white pine forests of the Northwest, declared that the supply of lumber from that source would be substantially exhausted by this time. But the white pine continues to come forward by thousands of millions of feet, and loggers and sawyers are not out of work yet, though some of what were the chief producing districts are pretty well cleared out.

The *Northwestern Lumberman* has recently published the statistics of the production of last year, which it compares with each of the 18 previous years, giving the production for each of 20 different districts. This

enables us to see where the business has decreased and where increased—a matter of great interest for a great many railroads. The total production of Northwestern pine lumber and shingles in millions of feet has been for the last 19 years:

Year.	Lumber.	Shingles.	Year.	Lumber.	Shingles.
1873.....	3,994	2,277	1883.....	7,625	3,965
1874.....	3,751	2,473	1884.....	7,935	4,560
1875.....	3,909	2,516	1885.....	7,653	4,258
1876.....	3,879	2,961	1886.....	7,425	4,578
1877.....	3,595	2,697	1887.....	7,756	4,116
1878.....	3,629	2,561	1888.....	8,360	4,515
1879.....	4,907	2,859	1889.....	8,306	4,699
1880.....	5,651	2,973	1890.....	8,065	4,488
1881.....	6,709	3,546	1891.....	7,943	3,755
1882.....	7,582	4,094			

Last year's production of lumber was thus the smallest for four years and a twelfth less than that of 1890, which is the largest on record. The shingle production (which is equivalent per 1,000 to perhaps one-fourth the number of feet of lumber) was nearly one-sixth less than in 1890. The decline was partly due to inability to get logs down the streams in Wisconsin, on account of low water, partly to a decreased demand, owing to bad crops in 1890, and only partly, and that apparently only in the lower peninsula of Michigan, to the exhaustion of the standing pine.

The production since 1878 has doubled, and since 1890, when it seemed so threateningly great, has increased 40 per cent., and few signs of the close approach of the exhaustion of the supply are visible; for it would almost certainly so raise prices as to decrease consumption. Of course we are so much nearer the end of the supply, for nothing is produced to take the place of the trees felled. Within the last ten years 78,650 millions of feet of lumber have been marketed from the pine territory, or an average of 7,865 millions yearly, against an average of 4,449 millions during the preceding nine years. This vast consumption cannot continue forever, but it is not going to stop just yet, and will form an important part of the business of many carriers for a long time to come.

Perhaps the most remarkable fact shown in the statistics is the obstinate way in which lumber continues to come from the districts which have been producing longest. Twenty years ago nearly all the lumber came from logs floated down streams in Michigan and Wisconsin and sawed at ports on Lakes Huron and Michigan and Green Bay and navigable waters of the upper Mississippi. Already it was said that this business must soon end, because little standing pine was left near logging streams. About that time railroads began to penetrate the lumber districts of the lower peninsula of Michigan, largely for the purpose of making available the pine which stood far from the streams. Now it is a notable fact that in Michigan the interior mills, which the railroads made possible, have not maintained their production any better than the Saginaw, Lake Huron and Lake Michigan mills. All three districts reached their maximum production in 1882. The interior or railroad mills increased their production from 622 millions in 1873 to 922 in 1882; and then decreased to 558 last year; meanwhile the production of the Saginaw and Lake Huron mills grew from 792 millions in 1873 to 1,455 in 1889, and sank to 1,207 last year; and that of Lake Michigan mills grew from 844 in 1873 to 1,392 in 1882 and 1,054 last year.

Since the year of the maximum the interior mills have decreased production 40 per cent., the Lake Huron mills 17 per cent., the Lake Michigan mills 24 per cent. This may seem to prove that talk of the approaching exhaustion of standing pine within hauling distance of logging streams was a false alarm, but it does not. When the railroads had proved that lumbering was practicable and profitable without a river, the mills at the old lumber towns began to use them to bring logs from all sorts of out-of-the-way places, either to their doors or to logging streams. Several of these lumber towns are railroad centers and can get logs from a much more extensive territory than is accessible to an interior mill, and the lakes give them still greater advantages for marketing their product. Otherwise it is not easy to understand how such a place as Muskegon, for instance, which has helped to supply Chicago with lumber almost as long as there has been any Chicago, should have produced its maximum as late as 1887.

The mills on Green Bay, also one of the oldest of the lumber districts, have kept up their product still more surprisingly, and doubtless for the same reason. Up to 1888 their largest production had been 687 millions, in 1883, but in the last four years they have turned out successively 730, 919, 881 and 824 millions. There the forests at considerable distances to the north and west were penetrated by railroads later than those of Michigan, and the old Green Bay lumber towns are sawing logs which come from the newer Western pine region, which has furnished the chief part of the increase in the supply since 1880.

As regards the separate lumber railroads in the

lower peninsula of Michigan, the mills on the Grand Rapids & Indiana, which averaged more than 300 millions per year from 1881 to 1887, have since yielded 222, 231, 192 and 165 millions, in successive years, indicating that the pine is really becoming exhausted. The Mackinaw Division of the Michigan Central had its maximum as far back as 1875 (155 millions), but from 1878 to 1884 it never reached 100 millions, averaging 83; since then it has never been less than 100 millions, and the average has been 125, a considerable growth, which has been cultivated by building branches expressly for this traffic. The Chicago & West Michigan mills have had a product about equal to that of the last named road for the last eight years, and well maintained until last year; but this is much less than in 1882 and 1883. The Flint & Pere Marquette mills produce much less, and show an almost continuous decrease; from 131 millions in 1881 to 69 last year. On the Detroit, Lansing & Northern the decrease is still more marked, from a maximum of 126 millions in 1884 to 20 last year, so that it can hardly be considered a lumber road any longer.

The greater part of the increase in production since 1880 has been in what the *Northwestern Lumberman* calls the "west of Chicago district," which includes, apparently, pretty much all the territory west of Green Bay, and as far east as the Milwaukee, Lake Shore & Western Railroad, but does not include all Lake Superior ports, some of which are included in the "Chicago district," probably because they ship their lumber chiefly to Chicago. The "west of Chicago" district is not likely to send much lumber to Chicago, as it can reach the Western markets more directly than through that city, and most of it cannot ship to Chicago by lake. Last year nearly one-half of the total production was in the "west of Chicago" district, against about one-third in 1873 and 1879. The growth of the business was marvelous. From 1,024 millions in 1870 it rose to 3,449 millions in 1884, an increase of 237 per cent. in six years. Of the whole increase of 5,036 millions between 1878 and 1890, 3,111 were in this district. Before the days of lumber railroads it had an important production on the Mississippi and its tributaries, and rafts were and still are floated far down the Mississippi to be sawed nearer the consumers. La Crosse, Clinton, Davenport, Burlington, Quincy and Hannibal, and even St. Louis to some extent, are producers of pine lumber, though hundreds of miles from the woods. Substantially the whole 1,253 millions of the "west of Chicago" district were produced at river mills in 1873. When a production at railroad mills is first reported, in 1880, the river mills produced 1,788 millions, which two years later became 2,357, and remained near that figure until 1888, and then passed it, reaching a maximum of 2,830 millions in 1890. This is still much the larger part of the production of Wisconsin and Minnesota, but the railroad mills have a much larger production than in Michigan, and it has grown rapidly and almost without interruption. In 1884, the first year in which the mills on all the railroads were reported, this production was 860 millions, rising to 1,305 in 1890 and 1,237 last year.

This lumber, as well as the greater part of that sawed at river mills, goes directly by rail to the consumers in the West and Southwest—all over Minnesota, the Dakotas, Iowa, Nebraska and Kansas, where it has taken the place, to a very great extent, of lumber shipped from Chicago. The production on a railroad, of course, is no criterion of the amount shipped over it, which depends more on the territory it reaches. Of the railroad mills, however, those on the Wisconsin Valley line of the Milwaukee usually produce most, followed by the Wisconsin Central, the Milwaukee, Lake Shore & Western, and the St. Paul & Omaha.

The following statement of the production of the several districts in 1882 and 1891 will best show the shifting of the sources of supply, the more so as the production in 1882 first attained nearly to the figures which have prevailed since. The figures are for millions of feet of lumber:

	1891.	1882.	Inc. or Dec.	P. c.
Total production.....	7,943	7,582	I. 361	5.2
Saginaw Valley.....	763	1,013	D. 250	24.7
Lake Huron Shore.....	438	412	D. 4	1.0
E. Lake Mich. shore.....	877	1,392	D. 515	37.0
Mich. railroad mills.....	558	922	D. 364	40.0
	2,636	3,700	D. 1,133	30.0
Green Bay shore.....	821	638	I. 185	29.2
Misc. Chic. dist. and L. Superior mills.....	470	158	I. 312	201.3
West of Chicago district:				
River mills.....	2,690	2,357	I. 312	14.5
Railroad mills.....	1,230	675	I. 555	115.5
Lake Erie points.....	70	55	I. 15	27.0
	3,990	3,783	I. 1,545	40.3

We have placed together those districts which have decreased and those which have increased their production. The decrease has been wholly in the lower peninsula of Michigan and is large everywhere except for the Huron shore mills, which in every recent year till 1891 have shown a large increase over 1882. In all the districts west of Lake Michigan a large increase is shown, but proportionally much the greatest in the railroad mills and the not very definitely defined territory, "miscellaneous mills, Chicago district, and Lake Superior," a small part of which are in the lower peninsula of Michigan, but the great bulk of their production is in the upper peninsula and so near to the lakes as to be easily shipped by vessels.

All this indicates that the railroads have been playing a great and increasing part in the lumbering operations of late years. By them the remote areas of standing pine have been made accessible to the loggers, until there can now be a comparatively small amount of it which is not accessible or cannot be made so by short branches. The lumber traffic is of immense importance to the railroads of the prairie states, to which it gives annually the largest item of return freight to fill the cars which move eastward loaded with grain and live stock. The change in the sources of supply has been unfavorable to the lines extending westward from Chicago and helps to explain the apparent eagerness of Chicago railroads to secure lines from the vicinity of St. Paul southward and southwestward. As comparatively a small part of the grain and substantially none of the live stock goes northward, it is less favorable to the railroads to carry lumber from Chippewa Falls, etc., to Iowa and Nebraska than from Chicago, but to get the lumber to carry they must go where it is.

Mr. Wheeler, the new Minister of Railways in Victoria, is already making extensive changes and reforms. He proposes to place the public railways on a sound commercial footing by reducing the number of trains and increasing the rates for goods carried.—*The Times (London).*

Here and there a philosopher in America has notions of railroad economy about as elementary as those of the Victoria Minister, but fortunately for the railroads and the nation such notions cannot be put into practice here. They may be when we have State control; but while railroads are private enterprises they will be put "on a sound commercial footing," by giving more service and cheaper service. It is conceivable that in an old community, where the supply of railroads is large and competition unrestrained, it will occasionally be wise to stop and economize by reducing facilities and raising prices; but it is inconceivable that in a new country like Victoria, where everything is yet to be developed, even the railroads, that condition can have been reached. At the end of 1880 Victoria's supply of railroads compared with that of some other countries as follows:

	Miles of railroad.	
	To 100 sq. miles.	To 10,000 people.
Victoria.....	2.6	20.5
United States.....	5.3	24.7
Europe.....	3.7	3.9
Gt. Britain & Ireland.....	16.4	5.2
Belgium.....	28.2	5.3

On the basis of population the colony was almost as well off in railroads as the United States, but it had only half as much to the square mile. At the end of 1890 the mileage and the ratio of mileage to population and area had risen. The colony then had 2,688 miles built and 215 under construction, all state railroad. This had cost £13,915 per mile (say \$60,000). The profit from operation amounted to 3.18 per cent. on the borrowed capital; but the interest averaged 4.14 per cent., so the colony has a considerable deficit in fixed charges to make up, hence, probably, a popular pressure to put these railroads "on a sound commercial footing." We have no reports of ton or passenger miles, or of the rates, and can get no accurate measure of the public service rendered. All the trains per day both ways, over the entire system, were 6.2 in 1880; in the United States they were almost exactly the same. But the business done per mile of road operated was evidently far less in Victoria. The passengers carried in the United States were 3,156 per mile of road operated; in Victoria they were 2,785. The tons carried were 4,080 in the United States and 453 in Victoria. But we do not know the length of haul or journey in Victoria.

The extra compensation to railroads for special fast mail trains which, as heretofore announced, is likely to be abolished after June 30, has been made the subject of a letter from the Postmaster-General to the Chairman of the House Committee on Post-Offices, which letter has been sent to the newspapers in various parts of the country. Mr. Wanamaker gives a detailed list of all the runs for which special payment is allowed and the total amounts of these special payments since they were begun in 1879. It appears that the Atlantic Coast Line receives by far the larger share of the \$285,000 now paid each year, as there are only three other runs included in the list. These are: New York to Springfield, Mass.; New York to Albany, and Baltimore to Hagerstown, Md. There is no extra compensation for the Atlantic

Coast Line route north of Philadelphia. Mr. Wanamaker's defense of his opinion that the extra compensation should be entirely abolished is based on the points heretofore stated, the main one being that the railroads enjoy large and rapidly increasing revenue from the ordinary pay. He says that the Atlantic Coast Line is receiving, for ordinary compensation, 25 per cent. more than it was four years ago and 117 per cent. more than in 1880. Those railroads which do not receive any extra compensation always argue upon the injustice to them of these special payments whenever Mr. Wanamaker tries to get them to run faster trains, and it is largely on this account that he has decided to discontinue all extra compensation.

The New York Central and the Rome, Watertown & Ogdensburg had a chance to use their rotary snow plows in clearing the snow after the storm of Feb. 11, and the machines did good service. This is, we believe, the first "emergency trial" in which a machine plow has figured in the Eastern states. The storm did not cover a great area, the principal trouble being between Utica and Rochester and in the territory between there and Lake Ontario, but it blocked the Central badly, many passenger trains being 12 hours and more behind time. The company has had to wait nearly four years for an opportunity to put its rotary into real and important service, but the officers seem well satisfied with the results, as the road was easily cleared through several cuts which otherwise would have had to be shoveled out by the slow process of hand work.

The arrangements for abolishing grade crossings in the city of Buffalo seem to be hampered by very perplexing obstacles. The Erie road objects to the plans agreed upon by the city and the other railroad companies, and has thus far interposed every possible hindrance to the commencement of work. The city, to secure better means of compelling compliance by the Erie with its plans, has asked for the passage of a supplementary law by the legislature, but after much negotiation at Albany the fate of this law is still in doubt, the city's representatives claiming that the influence of the road upon the legislature is unduly strong. Meanwhile the Buffalo City government has adopted a severe low-speed ordinance by which it is expected to compel the roads, particularly the Erie, to take more energetic action toward making the necessary changes in grade.

The Baldwin Locomotive Works have completed two suburban engines from new and unique designs furnished by Mr. L. B. Paxson, Superintendent of Motive Power of the Reading. These engines have Wootten fireboxes and six drivers, with a two-wheeled truck front and a six-wheeled truck back. They are intended to burn anthracite slack and have been put in service on the Illinois Central suburban tracks. They are compounded on the Vaucrain system and differ from other Wootten engines in having the cab at the back of the boiler, so that the fireman and engineer are together. An extensive trial will be made of these engines in this service, and it is reported that if they prove satisfactory they will be the basis of a new standard suburban engine for several roads in the vicinity of Chicago.

#### NEW PUBLICATIONS.

*The Electric Railway.* By Oscar T. Crosby and Louis Bell, Ph. D., New York. The W. J. Johnston Company, Limited. 1892. Price, \$2.50.

This eminently practical treatise on the methods of operation and construction of electric railroads and their equipment is a real addition to the literature of the subject. No other work gives much that is of practical use to the operating officers and the mechanics of such railroads.

The chapter on motors and equipment contains general instructions as to the care of motors and their operation, which are well prepared and are a valuable addition to the work. Anyone reading this chapter can, from it, become comparatively well informed upon the purpose and construction of the mechanism which has directly to do with the starting and stopping of cars.

The cuts showing the characteristics of the winding on the different kinds of dynamos and motors are exceptionally explicit, and the meaning of the words "series" and "multiple," so confusing to the layman, are explained in such a simple way, on page 15, that no one could fail to understand them. There are some general deductions about electricity which have been drawn from complex experiments that are so complex when expressed in words that it is next to impossible for the beginner to understand them, yet in this work they are clearly shown by diagrams and curves, and so well lettered and arranged that they are easily comprehended. This is particularly true of the varying efficiencies of motors under different conditions with different amounts of current and running at different speeds. So, too, with the magnetic properties of various kinds of iron and steel. The diagram for this last shows forcibly the great value of soft annealed irons for the field magnets and armatures of electric motors of light weight.

The part of this work which is of most direct interest to the capitalist and the investor in street railroad stocks is that on the efficiency of electric traction. Diagrams are

given showing the efficiency of the dynamo itself under a varying load, of the plant as a whole, and of motors combined with the plant. Regarding this efficiency, the authors say: "65 per cent. is probably a high average for station efficiency in the roads now built. The line efficiency may be taken at about 92 per cent., giving a total efficiency up to the motor of approximately 60 per cent. With the motors and the gearing generally employed, the average commercial efficiency of the combination is probably not often in excess of 65 per cent., giving a total of commercial efficiency for the system from engine to car wheel of 30 per cent. This, of course, is but an estimate; but taking all the factors into consideration, it is probable that the average of the roads now in operation would fall quite nearly to the point indicated. In very few cases would it fall below 30 per cent., but in still fewer would it rise much above 40 per cent. . . . Anything over 50 per cent. can be attained only by the utmost care in design and construction, and it is very doubtful if this point is passed by any line now operated."

Many mechanical and civil engineers will be interested in these statements, as they correspond more nearly with the ideas of engineers generally than do the enthusiastic statements of manufacturers of electric motors to the effect that the efficiency of street car motors and systems approximate to 80 and 90 per cent. Calculation shows that with any devices now used for the utilization of the electric current for the propulsion of railroad trains the efficiency will fall below 50 per cent.

The chapter on storage battery traction if well read by capitalists will prove so convincing as to the commercial inefficiency of that method of street car propulsion as to reduce the amount of money that has been thrown away yearly in the past in attempts to force the adoption of this system before its time. The various plans for this kind of traction are well explained, and details of accumulators are given.

Cuts are given showing the various types of street car trucks and motors in use and the connections between the armatures and the wheels; also sections are given of the various arrangements of rails and tracks and the methods of supporting the line wires. There is a valuable chapter on the arrangement of stations and another on commercial considerations.

To those who object to the overhead system and its complication of wiring and unsightly poles, the chapter on miscellaneous methods of electric traction, which describes the underground conduit system, will prove interesting. The various schemes are well described, and it is said that, "the whole group of devices that have just been described are interesting both mechanically and electrically, but have none of them passed the experimental stage; and while it is perhaps not too much to expect that something practical and valuable will be evolved from the amount of ingenuity that has been spent upon them, the time is not yet. This line of investigation, however, is of more than usual promise."

There is a chapter of historical notes, and there are appendices giving the decisions of the courts on various important questions relating to interferences between electric railroads and other railroads, and the telephone systems. Appendix B is a set of instructions to linemen adapted to the best current practice. Other appendices relate to classification of expenditures, maintenance of property, protection from lightning (by Professor Elihu Thomson), and an engineer's log-book.

*The Mechanical Engineer's Pocket Book.* By D. Kinneer Clark, M. Inst. C. E., &c., &c. Pp. 666, index. New York: D. Van Nostrand & Company, 1892. Price, \$3.00.

It is hardly necessary to introduce a reference book by Mr. Clark. It goes without saying that its contents are what engineers want in practice, that they are well arranged and that they are reliable—all this of course within reasonable human limits; moreover, the size of the book, 4 in. x 6 in., makes it extremely convenient to carry and consult. The compiler has made up the book expressly with a view to the requirements of the mechanical engineer. To that end he has collected about 350 tables and 500 formulae and rules, which have been compiled or calculated anew or drawn from various sources; many of them are original.

The division of mathematical tables fills 102 pp. and that of measurements of surfaces and solids 9 pp. The divisions of weights and measures fill 61 pp., and are the most complete collection of such data in a form really available that we know of. There is a particularly good collection of English-French and French-English compound equivalents. Thirty-four pp. are given to specific gravity, etc., and over 100 pp. to weights and sizes of manufactured products of the metals. The divisions which treat of strength of materials in general, and various constructive forms, fill 71 pp. These are only a few of the principal divisions of the work. Some of the others are: Heat, 27 pp.; Steam Engines and Boilers, 26 pp.; Railroads, 13 pp.; Water Power, 14 pp., and finally Electrical Engineering, 33 pp.

On the whole, in material and in arrangement, this is one of the best pocket books that we know of. It cannot replace "Trautwine," for it covers only a part of the field; but in its own field it has some advantages not only in fuller treatment but in more agreeable typography,



## TRADE CATALOGUES.

*The Brightman Stoker Co.*, of Cleveland, O., has sent out a pamphlet of 32 pages describing the Brightman mechanical stoker. There are cuts showing the location of the stoker and its construction for various types of boilers, and descriptions of its operation; also an argument on the best means for reducing smoke from steam plants.

*Some Points about Grinding Tools* is a pamphlet issued by J. Wendell Cole, District Manager of the Detroit Emery Wheel Co., Chicago, Ill., and Columbus, O., that has a useful arrangement of tables and cuts showing the best angles for grinding tools. There is considerable argument in the pamphlet as to the best shape of tools.

*The Abendroth & Root Manufacturing Company*, 28 Cliff Street, New York, issue an illustrated pamphlet, concerning the manufacture and uses of their spiral riveted pipe, also giving views of situations where it is employed. There is an illustration of the St. Clair Tunnel, showing the riveted pipe used for ventilating.

## TECHNICAL.

## Manufacturing and Business.

The Pittsburgh Car Wheel Co., recently organized for the manufacture of car wheels, has purchased the plant of the Iron City Manufacturing Co. in Pittsburgh, and will soon start a branch of the Buffalo Car Wheel Co. in that city.

The Norristown Steel Co. has ordered from the Morgan Engineering Co., of Alliance, O., a 30-ton electric traveling crane, which is to be erected in the extension of the main building which is now building at Norristown, Pa.

The Bluffton Car Wheel Co., of Bluffton, Ala., recently put in operation, is working on an order for 500 car wheels for the East Tennessee, Virginia & Georgia.

The Northwestern Wheel and Foundry Co., of St. Paul, has been incorporated with a capital of \$250,000. The officers are: President, David C. Green; Vice-President, William H. Lightner; Secretary, Edward B. Young; Treasurer, Wm. P. Harper. This company succeeds the Milwaukee Car Wheel and Foundry Co., which recently removed to St. Paul. Wheels will be cast for the first time on April 1.

Messrs. Coolbaugh & Pomeroy, of 29 Broadway, New York, have been appointed special railroad sales agents for the Cambria Iron Company's rails, forgings, axles, etc. The Cambria steel axles undergo the "Coffin toughening process," by means of which the irregularities of forging are relieved and the elastic limit is increased nearly one-half.

## Iron and Steel.

A new plant is to be built in West Troy, N. Y., for the Troy Malleable Iron Works Co. The new buildings will be of brick and generally two stories high. The Albany branch of the works will be consolidated with the Troy plant when the works are completed and employment will be given to about 400 men.

Work on the plant of the Eagle Rolling Mill Company, at Ironton, O., is progressing rapidly and it is expected that the plant will be ready to commence operations about April 1.

The announcement is made that the National Tube Works Company, the largest makers of tubes and pipe in this country, will put up a two eight-ton Bessemer plant with a daily capacity of 800 tons.

The new gun-testing department of the Midvale Steel Works, at Nicetown, Pa., has been completed, and work on a new machine shop, 250 x 200 ft. in size, will soon begin. The company has recently secured 32 additional acres of land adjoining the present plant, upon which extensive improvements will be made.

The Maryland Steel Co., of Baltimore, has decided to erect a large open hearth furnace plant and plate and shape mills to make material for bridges, iron buildings and ship work.

Furnace F, of the Edgar Thomson group, belonging to Carnegie Bros. & Co., has gone out of blast after a run of over two years, with a production of over 253,000 tons of Bessemer steel.

Lukens steel has been specified for eight engines building by the Cooke Locomotive Works for the Louisville & Nashville, and for 30 engines building by the Baldwin Locomotive Works for the Missouri Pacific.

The Lukens Iron and Steel Co. reports recent orders for steel from the Lehigh Valley, New York, Susquehanna & Western, New York, Ontario & Western, Delaware, Lackawanna & Western, Central Vermont, Buffalo, Rochester & Pittsburgh, New York, Providence & Boston, South Carolina, Missouri Pacific, Kansas City, Fort Scott & Memphis, and other roads.

## New Stations and Shops.

The Michigan Central will soon build a four-story brick and iron freight house on the South Water street in Chicago. The building will be 150 ft. x 400 ft., and will have large elevators to hoist freight to the upper stories.

The first of the large iron arches for the Reading terminal trainshed in Philadelphia was completed by the Phoenix Bridge Co. last week, and a second arch is

also nearly completed. The contractors expect to complete the seven iron arches between Filbert and Arch streets in about two months.

## Car Couplers.

The New York, Lake Erie & Western is replacing the Miller platform and coupler on its passenger cars with the Janney. In the construction of the new Pullman cars built for this road, this action has been anticipated, and the change on those cars will be simple and easily made.

## Ore Docks of the Duluth, Mesabie &amp; Northern.

The dock projected for construction this year will be 600 ft. in length, 54 ft. high and will contain 100 pockets, each having a capacity of 110 tons. The contract for 2,500 piles was let last week.

## Tunnel Lighting in France.

The Minister of Public Works has approved a plan presented by the Western Railroad of France for lighting the Batignolles tunnel. The tunnel will be lighted by electric lamps, the rays from which will be collected by special reflectors and directed on the announcements, signs, etc., that it is desired to illuminate. The lighting will be continuous, for the convenience of employes passing through the tunnel, but it will be especially bright during the passage of trains.

## The Edison Shops of the Northern Pacific.

There is now employed at the shops of the Northern Pacific at Edison, Wash., near Tacoma, a force of 350 men. The engine and car repairs and renewals for the western end of the road are taken care of here. Work has been begun on 200 palace stock cars, and it is probable that a large number of platform and box cars will be built during the year. Locomotive cabs and tender frames are also built here. In the construction of these stock cars yellow fir will be principally used, and, while the company's specifications are very strict, they have experienced no difficulty in purchasing it at 50 per cent. cheaper than a good quality of white pine can be had in Minnesota. White oak is used for draft timbers, deadwoods and truck transoms. These cars will be equipped with M. C. B. couplers, Butler drawbar attachments, Schoen steel centre plates and malleable iron will be used largely in their construction.

## Electric Roads at Berlin.

Supplementary to the short account recently given in the *Railroad Gazette* of the proposed underground electric railroads for the city of Berlin, it is of interest to note that some time ago Mr. Werner Siemens submitted to the municipal authorities two different projects for the establishment of electric elevated roads, the structures, it would seem, to be modeled, in the main, after the elevated railroads in the city of New York. Neither of these projects, however, received favorable consideration.

Quite recently the well known German firm of electrical engineers and contractors, Messrs. Siemens & Halske, prepared new designs for a whole network of electric railroads for Berlin, and these, it is thought, in view of recent agitation in the line of rapid transit for cities, are now more likely to command attention. The general character of the structures to be erected is illustrated in the *Zeitschrift of the Austrian Engineers' and Architects' Society*, of Feb. 19, 1892, and is also somewhat similar to those of New York, there being two lines of pillars, with cross girders, carrying a double line of tracks. Electric locomotives, it appears, are not to be employed, but instead, each car is to be fitted with one or two independent electric motors. The illustrations given by our contemporary show a side elevation and a cross-section of the proposed structure, and also a view of one of the way stations.

## Elevated Railroads in Chicago.

Two elevated road franchises in Chicago have passed the committees appointed by the council for investigation. One is for the extension of the "Alley" road, which has already five miles of the structure erected, and the other is for the Metropolitan West Side Railway. It is believed that these ordinances will pass the City Council at its next meeting, as owing to the recent investigations by the Grand Jury the Aldermen are less inclined to interfere with ordinances that are for public benefit. "Boodlesism" is just now at a discount in Chicago. Seven aldermen have been indicted for accepting bribes and for other crimes in connection with the economic gas, Northern Pacific terminal and compressed air ordinances.

## Electric Equipment for the Duluth Street Railroad.

The Northwestern Thomson-Houston Electric Co. has secured from the Duluth Street Railroad, through Mr. J. H. Finney, a contract for 21 complete car equipments, consisting of two single reduction generators equal to 15 H. P. each. The same company has the contract for the installation of two multipolar generators equivalent to 335 H. P. each for the new power house of the Duluth street railroad. Power is supplied by a triple expansion 1,000 H. P. engine, built by the E. P. Allis Co. of Milwaukee.

## THE SCRAP HEAP.

## Notes.

A Washington dispatch of March 20 states that the House Committee which has been considering the proposed coupler laws will soon report a bill.

Twenty-one electric street cars were burned up in a fire at the stables of the Missouri Railroad Company, at St. Louis, March 15. The total loss was \$47,300.

The upper floors of the passenger station at New Haven, Conn., occupied by the general offices of the New York, New Haven & Hartford, were burned out on the evening of March 19, the loss being perhaps \$101,000.

A local agent of the Illinois Central has been on trial at Springfield, Ill., for using the United States mails for fraudulent purposes. It is alleged that he aided a forger in securing half-fare tickets for imaginary clergymen, the applications for these tickets bearing the forged approval of a local agent's name. The tickets were sold to scalpers.

Through passenger traffic over the Southern Pacific between San Antonio and El Paso, Tex., was suspended several days last week by the burning of a trestle over a deep cañon, the locality being such that passengers could not be transferred. One report states that a freight train ran upon the burning bridge and was wrecked.

The Maryland legislature passed a law in 1888 requiring the abolition of stoves in passenger cars, but the time was extended in 1890 to July 1, 1891, with a further provisional extension to May 1, 1892. But the roads have not done much, and now ask a further extension of two years. The newspapers urge the Legislature to refuse the demand.

The snow storm in northern New York continued to trouble the railroads for several days, and it was reported as late as Monday of this week that no trains were being run on the Rome, Watertown & Ogdensburg between Wallington and Richland, 67 miles. It appears that the rotary snow plow was disabled for some time by a derailment.

A press dispatch from Wilmington, Del., reports a serious encounter between three officers and four burglars on a passenger train near Dover about 3 o'clock one morning last week. It appears that the officers had followed the men on to the train with the intention of surrounding them after it had started. The officers, on entering the car occupied by the burglars, drew their pistols and succeeded in terrifying the passengers, but the burglars made out to get off the train while it was running, though it seems that one of them, at least, was fatally wounded.

The difficulties with the employes seem to have seriously interrupted freight traffic on the lines of the Canadian Pacific between Winnipeg and the Pacific coast, though the dispatches are fragmentary and it does not appear in all cases whether the men struck or the company discharged them. A considerable number of conductors and brakemen struck at Winnipeg March 17, and a dispatch of March 21 reported similar action at Vancouver. Some men also struck at North Bay. Lawless interference with trains was reported from one or two places and the government was called on for military or police protection. Certain conductors and brakemen on the Grand Trunk announce that they have made a demand for increase and readjustment of pay.

## Spanish American Notes.

The government of Uruguay contemplates following the example of Argentina in assuming fiscal intervention in the affairs of guaranteed railroads.

The laying of rails upon the Caixas Railroad, in the State of Maranhao, Brazil, is nearly finished, and the line will be opened to traffic this summer.

The Director General of the post office in Argentina has ordered a postal and telegraph map of the Republic to be drawn and printed for general distribution.

The shipment of nitrate of soda from Antofagasta, Chili, during the year 1891 amounted to 22,000 tons, upon which a duty of nearly 600,000 pesos was collected.

C. Vignoli & Co. have made a bid to the Uruguayan government for the construction of a lighthouse on Lobos Island, off the coast of Maldonado. It is to be 33.40 metres high and will have an intermittent light visible 18 miles.

The bridge over the Rio de los Valles in Mendoza, Argentine, is in so dilapidated a state that nearly the entire structure is to be renewed by order of the Minister of Finance. Several new short, single-span bridges are to be built in the vicinity of Mendoza.

The Argentine government has authorized the Flores Lille Co. to open the San Cristobal & Tucuman Railroad from Fortin Inca, kilometre 161, to Fortin Mellero, kilometre 382. This company is also seeking, through the agency of M. Sampite, permission to construct two branches as feeders to its line.

According to recent advices the receipts on several of the Argentine railroads show an increase during January and February of this year over the corresponding period of 1891. This increase is most noticeable in the cases of the Buenos Ayres & Rosario, the Argentine Great Western, and the Buenos Ayres & Pacific roads, the gain on the latter line amounting to \$108,400.

The Empresa das Obras Publicas no Brasil has defaulted in its last payment for the purchase of the franchise and plant of the Amazon Steam Navigation Co. The sum previously paid amounts to \$655,000, which is subject to forfeiture according to the terms of the contract, owing to the failure to remit this last instalment of \$30,925. The Amazon Steam Navigation Co., however, will not enforce the letter of the agreement, but will give the Brazilian Company some time.

The exposition at Quito, Ecuador, which was to have been inaugurated in February, has been postponed until May 1, in order to take advantage of the open season, when traveling across the mountains will be easier. The



exposition promises to be extremely interesting, and, it is thought, will give a decided stimulus to trade with the foreign manufacturers who may make exhibits.

The gross earnings of the Costa Rica Railway for the week ending March 1 amounted to \$55,630. The length of the road is 96 miles.

The Cartagena Terminal & Improvement Co. has taken its first practical step toward carrying out an enterprise of the highest importance in Colombia by the shipment of a cargo of material for railroad construction from New York via the Atlas line steamer "Andes" during the past week. By the same vessel a corps of engineers under Mr. W. D. Buckner set out to take charge of the work of building the line of road projected from Cartagena to the town of Calamar on the Rio Magdalena, a distance of 52 miles. This work is under the control of American capitalists including, among others, James P. Colgate & Sons, Morris K. Jesup, Chas. R. Flint, M. C. Martin, Jefferson Coolidge, Frederic L. Ames, Oliver Ames, A. W. Nickerson, John L. Gardiner, J. M. Forbes and S. B. McConico. Two companies have been organized, viz., the Cartagena & Magdalena Railroad Co., with a capital stock of \$1,800,000 and bonds to an equal amount, and the Cartagena Terminal & Improvement Co., with a capital stock of \$1,200,000. The completion of this road will unquestionably divert practically the entire trade of Sabanilla and Baranquilla to Cartagena and its corresponding river port of Calamar.

#### A Big "Laker."

The Detroit Dry Dock Co. have just closed a contract with the Shaw-Eddy firm of Bay City for a steamer 362 ft. 6 in. long with 42 ft. beam and 24 ft. depth of hold. This, when completed, will be one of the largest vessels flying the United States flag. The commerce of the great lakes is generally understood to be a big thing, and considering the length of haul it has for a long time employed vessels of greater tonnage than in any other trade, but this vessel is longer by nearly 50 ft. than anything heretofore built on the lakes. If vessels of this size (and there is a possibility of a sister boat being built) are built for a depth of 16 ft. it will be interesting to see what will be the standard type when a 20 ft. navigation is secured.

#### Copper Production.

Messrs. Merton & Co., metal dealers, London, have sent to the *Engineering and Mining Journal* their annual circular, from which it appears that the production of copper for 1891 was 274,714 gross tons. Of this the United States furnished 128,179 tons, or 46.7 per cent. of the world's production. Twenty five years ago, in 1867, our total output was 10,000 gross tons, Lake Superior mines furnishing 80.2 per cent. of our production; and in 1891 the proportion from Lake Superior was only 36.3 per cent. The growth has been a very healthy one, as there has been an increased production every year, except for 1872 and 1886, since 1867, and for most years there has been a more general distribution of production in this country. After the United States, Spain and Portugal take rank, with a production of 53,915 tons, nearly three-fifths of which is produced by the Rio Tinto. The production of Chili has fallen in eight years from over 41,000 tons to 20,600 in 1891. All of South America adds 29,140 tons; Japan, 17,000, and Germany 16,250 tons.

#### New Screw Transfer Boat.

The new steamer "Hartford," one of the New York, New Haven & Hartford transfer boats, was launched at Neafe & Levy's ship yard, March 12. The boat is 249 ft. long, 40 ft. beam, and will have night accommodations for 200 passengers, besides ample room for freight. The "Hartford" is a screw propeller.

#### Graphic.

The patentee of a danger signal asks the *Railroad Gazette* to make two drawings to show the merits of his signal. The following are his specifications: "One showing a collision of two trains meeting around a dangerous curve and a terrible smash up with a few *awee stricken* lookers on. The other cut showing two trains coming in opposite directions rounding a dangerous curve at a public crossing each train to have hoisted its Danger Time Signals which have brought them to a dead stand still just in time to prevent the collision and each Engine driver looking out of his Cab window congratulating each other of their safety deliverance with hats off cheering."

#### Truth and Poetry.

In Germany some of the train rules furnished the railroad employes are now issued in the shape of rhymes, whether poetic or other we cannot say. As we never before heard of this idea we conclude that it is a novelty just introduced by the Emperor William, who is not without fame as a producer of novelities. The \$1,000 *Railroad Gazette* prize for the best metric version of our Standard Code has not yet been awarded, owing to the discouraging fact that there are as yet no competitors for it (which is owing, perhaps, to the dignified and severely classical character of the body that publishes that code); but the Muses do not perpetually frown on American railroaders, as the few rare gems printed in the *Railroad Gazette* in past years will testify; and as we ought to do something to show that we are not behind Germany in esthetic progress we give place to-day to a Pittsburgh clipping which will delight our readers. It is claimed to be a dispatch sent by a Pittsburgh & Western freight conductor to headquarters on the occasion of a wreck:

"The night was dark and stormy,  
We couldn't see the cars;  
They broke in two at Downeyville  
And we piled them up at Mars."

#### Revamping the Rules.

The following extract from an item in a local paper, giving the substance of an order lately issued by a New York railroad, illustrates some of the difficulties in making and enforcing an effective flagging rule.

"The order requires a passenger trainman, when his train has stopped between stations, to go back one mile, instead of one-half mile as before, to signal any train that may be following on the same track. If he is near a station the order requires him to cause the station agent to set the station danger signals in addition to the trainman's. Continuing, the order says: 'A great many accidents happen in consequence of lack of prompt action when a train slackens speed for some cause. It must not be concluded from the fact that a train is in motion that it need not be protected. A following train running 25 miles an hour will soon overtake a preceding train running 12 or 15 miles an hour, and the obligation to protect the train is just as imperative as though it had come to a standstill. It must be protected just the same.'

#### CAR BUILDING.

The Pittsburgh & Western has recently built at its shops at Allegheny 10 new work cars, and has six others in course of erection.

The Great Northern has placed an order with the Haskell & Barker Co. for 250 ore and coal cars, 200 40-ft. platform cars, and 400 box cars, all of 60,000 lbs. capacity.

The Duluth & Iron Range road has ordered 125 cars of 24 tons capacity from the Wells French Co., of Chicago, with the Westinghouse air brake, National hollow brake beams, and Safford draw bars.

A car repair shop has recently been started in Denver, Col., under the control of the St. Charles Car Co. It is reported as likely that new machinery will soon be purchased and the plant enlarged for building freight cars.

The American Refrigerator Transit Co. has leased the Frost Proof Car Co., of Boston, which has been running a line of frost proof cars for the transportation of fruits and vegetables between Boston and Canada for the last two or three years.

The Missouri Pacific has recently let an order for 2,000 freight cars, including 500 Canada cattle cars, which are to be built by the Ensign Manufacturing Co., of Huntington, W. Va. The St. Charles Car Co. is to build 1,000 box cars and 500 coal cars.

The St. Charles Co. is building 300 box cars and 200 platform cars for the Atchison, Topeka & Santa Fe; 100 coal cars for the St. Louis & Cairo Short Line, and also 500 box cars for the Peavey Elevator Co., which are being turned out at the rate of 15 and 18 a day.

The Duluth Manufacturing Co. is quite busy, employing 450 men. This company is at work upon the following orders: 25 iron cars for the Knoxville, Cumberland Gap and Louisville; 300 34-ft., 50,000-lb. box cars for the Lake Erie & Western and six cabooses for the Duluth & Iron Range. The company is also making a large number of logging and push cars as well as special iron work for bridges and ore docks; and turn out a considerable quantity of merchant iron from the rolling mill connected with the plant.

The St. Charles Car Co. has recently received an order from the Washburn for eight elegant 64-ft. first class passenger cars, eight smoking cars of the same dimensions, with 8-wheel trucks, smoking room, and all the latest improvements, and also for eight standard baggage cars. The company will soon have completed 10 handsome day passenger cars for the Lake Shore & Michigan Southern and two baggage cars for the Pittsburgh & Lake Erie. The passenger cars for the Washburn and the Lake Shore roads will all be finished in mahogany.

#### BRIDGE BUILDING.

Brownsville, Tex.—The Senate bill authorizing the Continental Bridge Co. to construct a bridge across the Rio Grande River, near Brownsville, Tex., was passed by that branch of Congress last week.

Buffalo, N. Y.—The city council has appropriated the sum of \$37,500 for the bridge at Elmwood avenue, which is to be built by the park commissioners. The appropriation for the structure is now \$75,000 and the plans have been modified so that the cost will come within this limit. When bids were asked some time ago the lowest proposal was \$98,000.

Cincinnati, O.—A board of United States engineers heard arguments last week on the proposed bridge across the Ohio River between Cincinnati and Covington, Ky. A company has been organized to build a new bridge, with a main span of 751 ft., over the river channel to be located below the present suspension bridge.

Clifton, Tenn.—The bill to authorize the St. Louis & Birmingham Railroad to bridge the Tennessee River at Clifton passed Congress last week.

Columbus, O.—The bill to authorize Franklin County to issue \$500,000 in bonds to build a bridge over the Scioto River at Town street, in Columbus, had been passed by the Ohio legislature.

The City Engineer has been instructed to prepare plans and estimates for a bridge over the railroad tracks at Front street extension.

Everett, Wash.—The town site companies, of Everett, have awarded the contract to the Washington Bridge Co., of Tacoma, for the construction of a bridge costing \$17,500 over the Snohomish River and several sloughs. The new structure will be the third bridge in or near the town.

Fry, Mont.—The Senate bill to authorize and regulate the construction of a bridge across the Kootenai River, at the town of Fry, county of Kootenai, Idaho, was passed by the Senate last week.

Llano, Tex.—The contract for building the iron bridge across the Llano River has been awarded to the Wisconsin Bridge Co. for \$32,500.

Manitowoc, Wis.—The Common Council has awarded the contract for the superstructure of a new iron bridge across the river at Eighth street to the Wisconsin Bridge & Iron Co., of Milwaukee, for \$13,400.

Muskegon, Mich.—The board of public works has been authorized to contract for the erection of a proposed bridge between the city and North Muskegon.

Newnan, Ga.—John A. Hunter will receive bids until April 6 for the construction of a bridge across Wahoo Creek, near Newnan.

New York City.—On the 18th inst. Senator Breckinridge introduced in the United States Senate a bill authorizing the New York & New Jersey Bridge Company to build a bridge across the Hudson River. This was referred to the Committee on Commerce. The same Committee, it will be remembered, reported adversely on the same, or essentially the same, bill before in this session.

Nicolaus, Cal.—The board of supervisors has ordered a drawbridge built at this point with a main span of 475 ft. and with about 1,000 ft. of trestle approaches.

Pittsburgh, Pa.—Plans prepared by Ferris, Kaufman & Co., of Pittsburgh, for a new bridge to span the Monongahela River at Twenty-second street, have been accepted by the government officers, but the contract has not yet been let. The structure will be 2,600 ft. long and 26 ft. wide, and will be used by the Suburban Rapid Transit Co. and for general traffic.

George T. Richards, Lincoln H. Partridge, Winfield B. Carson, Erwin W. Smith, all of Pittsburgh, and George B. Motheral, of Allegheny, are the incorporators of the Braddock & Homestead Bridge Co., of Pittsburgh, to which a charter was granted this week.

St. Charles, Mo.—The engineers have been engaged for the last few weeks in boring for foundations for the piers of a proposed highway bridge across the Missouri River at St. Charles, Mo. The charter has not yet been secured from Congress, but it is reported that the plans have been prepared for the bridge, which will cost about \$250,000, by Mr. J. A. L. Waddell, of Kansas City.

Sanderson, Tex.—The Southern Pacific will begin the erection, as soon as possible, of a new bridge over the river at this point to replace the structure recently burned.

Warsaw, Mo.—The Senate has passed the bill authorizing the construction of a bridge across the Osage River at Warsaw.

Miscellaneous.—The Toledo Bridge Co., which has succeeded the Smith Bridge Co., of Toledo, has a large number of contracts for railroad bridges and, in addition, several long highway spans and two draw spans, which will keep the shops in operation for three months. The railroad work includes bridges for the Toledo, Ann Arbor & North Michigan, the Toledo, St. Louis & Kansas City, the Evansville & Terre Haute, the Columbus, Hocking Valley & Toledo and the Flint and Pere Marquette.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Powers, Liabilities and Regulation of Railroads.

In Colorado the Supreme Court decides that the provision of the U. S. Constitution which confers power upon Congress to regulate commerce among the several states does not inhibit the taxation by a state of cars found within its borders, though in the transaction of business they pass into adjoining states and territories.

The Supreme Court of the United States holds that the statute incorporating the Union Pacific and other railroad companies, and providing "that there be and hereby is granted" to such companies, to aid in the construction of the roads, every alternate section of land designated by odd numbers to the amount of five alternate sections per mile, etc., operated as a present grant of the legal as well as the beneficial title, which title became attached to the specific sections of land upon the filing of the maps of definite location of the road.

A statute of Maine requires every corporation, etc., operating a railroad in the state to pay "an annual excise tax for the privilege of exercising its franchise," the amount of the tax to be determined according to a sliding scale proportioned to the average gross earnings per mile within the state for the year preceding the levy of the tax. It is held by the Supreme Court of the United States that the method of determining the amount of the tax is merely a way of ascertaining the value of the privilege, and does not render the tax a tax upon the receipts themselves, and hence, in its application to railroads which enter the state from another state or from Canada, the act does not operate as a regulation of commerce.

In Indiana an instrument which was in form a lease of a railroad by one company to another also provided that the two companies should operate the road jointly, and should have equal rights thereon; that each company should settle all claims for damages caused by its own trains and that the lessor was to direct the running of all trains and prescribe the rules therefor. The Appellate Court holds that this was a valid lease, and not a mere running arrangement, with license to use the road, and the lessee was liable for stock wrongfully killed by its trains, as the law of 1881 provides that every railroad company running its trains on the track of another company shall be liable to third persons for all damages caused thereby.

In Missouri the Supreme Court rules that the mere non user of a right of way granted to a railroad company will not extinguish the right in the absence of adverse possession by the servient owner, or of such acts on the part of the railroad company as evince a clear intention to abandon the right of way.

##### Carriage of Goods and Injuries to Property.

In the Federal Court it is ruled that in an action by a shipper against a railroad company for charging a greater compensation for a shorter than for a longer haul, in violation of section 4 of the Interstate Commerce law, the measure of damages is the excess in the rate charged for the shorter haul over that for the longer haul, multiplied by the number of hundred pounds shipped by the plaintiff.

In Alabama it is held that the code provision that carriers exacting exorbitant charges for freight are guilty of extortion, and liable for double the damages sustained, does not apply to shipments over lines without the state.

In Texas, the Supreme Court rules that a provision in a contract with a carrier for the shipment of cattle, limiting the shipper's damages, in case of loss or partial loss, to the value of the cattle at the place of shipment, cannot affect the shipper's right to recover the true value, if loss is caused by the carrier's negligence.

In Texas, the defendant railroad charged \$1.70 per 100 lbs. on freight from San Francisco to El Paso, and \$2 on freight to the City of Mexico; its line connecting at El Paso, which was about half way, with the Mexican Central. The Supreme Court decides that even if there was any discrimination in the rates against El Paso in favor of the City of Mexico and points along the Mexican Central, it would not be subject to consideration under a state law, the shipment being from a point without the state.

In Texas it is held by the Supreme Court that damages can be recovered for injuries sustained from the existence and operation of a railroad and coal-bins in close proximity to one's lot, although they do not occupy the street upon which the lot abuts, nor disturb ingress and egress to and from the same.

In Kansas it is held by the Supreme Court that where the owner of land by a parol contract authorizes a railroad company to take possession of a portion for a right of way, and construct its railroad across the same, for which the company agrees to pay him \$75, he cannot, after the company has, with his knowledge and consent, taken possession, and constructed its road, maintain ejectment against it, on its refusal to pay the \$75, but his remedy is an action for the money.

<sup>1</sup> D. & R. G. Ry. Co. v. Church, 28 Pac. Rep., 468.

<sup>2</sup> Deseret Salt Co. v. Tarper, 12 S. Ct. Rep., 153.

<sup>3</sup> State v. Grand Trunk R. Co., 12 S. C. Rep., 163.

<sup>4</sup> Washburn R. Co. v. Williamson, 29 N. E. Rep., 455.

<sup>5</sup> Roanoke Investment Co. v. Kansas City & S. E. R. Co., 17 S. W. Rep., 1000.

<sup>6</sup> Osborne v. C. & N. W. Ry. Co., 48 Fed. Rep., 49.

<sup>7</sup> M. & O. R. Co. v. Dismukes, 10 South. Rep., 280.

<sup>8</sup> Ft. W. & D. C. Ry. Co. v. Greathouse, 17 S. W. Rep., 531.

<sup>9</sup> So. Pac. Ry. Co. v. Haas (Tex. Sup.), 17 S. W. Rep., 600.

<sup>10</sup> Ft. W. & R. S. R. Co. v. Downie, 17 S. W. Rep., 530.

<sup>11</sup> M. Pac. Ry. Co. v. Gass, 25 Pac. Rep., 155.



## MEETINGS AND ANNOUNCEMENTS.

## Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Chicago, Rock Island & Pacific*, quarterly, \$1 per share, payable May 2.  
*New York Central & Hudson River*, quarterly, 1½ per cent., payable April 15.  
*Pittsburgh, Youngstown & Ashtabula*, semi-annual, 3½ per cent. on the preferred and 3 per cent. on the common stock, both payable March 25.

## Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Chicago & Alton*, annual, Chicago, Ill., April 4.  
*Chicago & Grand Trunk*, annual, Chicago, Ill., April 13.  
*Cincinnati, Saginaw & Mackinaw*, annual, Saginaw, Mich. (East Side), April 19.  
*East & West*, annual, New York City, N. Y., March 29.

*Herkimer, Newport & Poland*, special, New York, N. Y., April 4.

*Herkimer, Newport & Poland Extension*, special, New York, N. Y., April 4.

*Joliet & Chicago*, annual, Chicago, Ill., April 4.

*Long Island*, annual, Jamaica, N. Y., April 12.

*New York Central & Hudson River*, annual, New York, N. Y., April 20.

*New York, Ontario & Western*, New York, N. Y., April 20.

*Panama*, annual, New York, N. Y., April 4.

*Philadelphia & Long Branch*, annual, Camden, N. J., April 4.

*Pittsburgh, Cincinnati, Chicago & St. Louis*, annual, Pittsburgh, Pa., April 12.

*St. Louis Southwestern*, annual, St. Louis, Mo., May 4.

*St. Lawrence & Adirondack*, special, New York, N. Y., April 4.

*Southern Central*, special, Philadelphia, Pa., April 12.

*Traverse City*, annual, Traverse City, Mich., May 5.

*Union Pacific, Denver & Gulf*, annual, Denver, Col., April 12.

## Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Association* will hold its spring meeting at New York City, April 13.

The *National Association of Car Service Managers* will hold its next annual meeting at Philadelphia, Pa., April 27.

The *Association of Railway Accounting Officers* will hold its fourth annual meeting at the Auditorium Hotel, Chicago, Ill., May 25.

The *Master Car Builders' Association* will hold its annual convention at Saratoga, N. Y., June 15.

The *American Association of General Baggage Agents* will hold its next annual meeting at Mackinac Island, Mich., July 20.

The *New England Railroad Club* holds regular meetings, at the United State Hotel, Beach street, Boston, Mass., on the second Monday of each alternate month, commencing January.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* holds regular meetings on the third Thursday in each month, at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, N. Y.

The *Southern Railway Club* holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m. in the directors' room of the St. Paul Union Station.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesday in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturday of each month. The annual meeting is held on the third Saturday in January. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursday at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 o'clock p. m. on the first Friday of each month.

The *Tacoma Society of Civil Engineers and Architects* holds regular meetings on the third Friday of each month, in its rooms, 201 and 202 Washington Building, Tacoma, Wash.

The *Engineers and Architects' Club of Louisville* holds regular meetings on the second Thursday of each month, at 8 o'clock p. m., at its rooms in the Norton Building, Louisville, Ky.

The *Association of Engineers of Virginia* holds regular meetings at Roanoke, on the second Saturday in each month, at 8 p. m., except the months of July and August.

## American Association of General Passenger and Ticket Agents.

The thirty-seventh semi-annual convention of this association was held at Monterey, Cal., March 16, John Francis, of the Burlington & Missouri River, presiding.

Officers for the ensuing term were elected as follows: President, A. S. Hanson, Boston & Albany; Vice-President, F. H. Chandler, Wabash; Secretary, A. J. Smith, Lake Shore & Michigan Southern. Bluff Point, Lake Champlain, N. Y., was selected as the place for the next meeting, which occurs in September.

## Boston Society of Civil Engineers.

The annual meeting of the society was held March 16, at the Massachusetts Institute of Technology, President F. P. Stearns in the chair; 73 members and 45 visitors present.

Percy M. Blake, Hyde Park, Mass.; Norman W. Eays, Wheeling, W. Va., and Frank A. Foster, of Boston, were elected members, and Arthur J. Wellington, Belmont, Mass., an associate of the society.

The annual reports of the Board of Government and the Treasurer were received. During the year the society has made a net increase of 25 in the number of members, the total membership being now 230; and the funds of the society have been increased about \$634. Ten regular meetings have been held during the year, with an average attendance of 73.

The result of the ballot for officers for the ensuing year was: President, Henry Manley; Vice-President (for two years), Albert F. Noyes; Secretary, S. Everett Tinkham; Treasurer, Edward W. Howe; Librarian, Frank W. Hodgdon; Director (for two years), Frederick Brooks.

The address of the evening was given by Mr. Thomas C. Clarke, of New York, on "The Progress of Bridge Building in the Last Fifty Years."

## Engineering Association of the South.

The regular March meeting of the Association was held at Atlanta, Ga., on Friday afternoon, March 11, President A. V. Gude, of Atlanta, presiding with 30 members and about 30 visitors present. The non-resident members and invited guests from Kentucky and Tennessee reached Atlanta Thursday evening by a special train.

The trip from Chattanooga over the Western & Atlantic was made in charge of Mr. Hunter McDonald, Resident Engineer of the road, and the train made numerous stops to inspect the extensive improvements on track and bridges now being carried on. These improvements comprise the building of between 20 and 30 iron bridges, the rebuilding of a large proportion of the masonry for the rehabilitating of a considerable portion of the roadbed, and the beginning of the relaying of the track with heavy steel rails. President Gude, in welcoming the Association and guests to Atlanta, outlined briefly the status of the Association and the engineering profession in the South. A communication was received from Mr. Octave Chanute transmitting a prospectus of the organization of the International Congress of Internal Water-Ways, which is to meet in Paris, France, beginning in July.

The following members were elected. As members: Edward B. Cushing, Resident Engineer Southern Pacific R. R., Houston, Tex., and W. N. McDonald, Assistant Engineer N. C. & St. L. R. R., Nashville, Tenn.; as juniors: Alex. H. Wood, Assistant Mining Engineer, Tracy City, Tenn., and W. T. Young, Engineer for the Youngstown Bridge Co., Nashville, Tenn. Applications for membership were received from Messrs. C. E. Hamlin and A. T. B. Somerville, of the King Iron Bridge Co., Chattanooga, Tenn.; P. H. Porter, Nashville, Tenn.; Prof. W. W. Carson, Civil Engineering University of Tennessee, Knoxville, Tenn., and Geo. Hall, Hydraulic Engineer, Atlanta, Ga.

Mr. Hunter McDonald, Resident Engineer W. & A. R. R., then read a paper on "Steel Rails," which was discussed by Messrs. Lodge, of South Pittsburgh, Tenn.; MacLeod, of Louisville, Ky., and Dudley, of Nashville, Tenn. The paper gave the history, chemical analyses, rate of wheel wear, results of bending tests and of tensile tests of three steel rails laid at different times on the N. C. & St. L. R. R. Mr. A. V. Gude presented a paper on the "Granite Quarries of Lithonia, Ga." The paper was discussed by Messrs. W. C. Smith, of Nashville, Tenn.; J. K. Peebles, of Petersburg, Va., and T. P. Branch, of Fort Valley, Ga. Mr. Peebles presented a description of the Petersburg, Va., quarries. The paper by Jas. A. Fairleigh, of Chattanooga on "Municipal Engineering in Chattanooga," and also the paper on the "New Water-Works of Atlanta," by Mr. R. M. Clayton, City Engineer of Atlanta, were deferred until April.

On Saturday morning the Association and guests were furnished a special car by Major Green, General Manager of the Georgia Railroad, and spent the forenoon in a trip to the granite quarries of Lithonia, Ga. The afternoon was spent in visiting the Georgia Technological Institute.

## Engineers' Club of St. Louis.

The Club met at 8 p. m., March 16, 1892, President Johnson in the chair and 16 members and two visitors present.

Prof. Potter announced that the Citizens' Committee on the "Prevention of Smoke" would make a report on

Friday evening, to which the members of the club were invited.

Mr. Arthur Winslow then presented the paper of the evening on "The Progress of Mapping in Missouri." The early attempts at maps of North America were described and copies of these maps were exhibited. Work was begun by the United States Coast Survey in 1871 with a triangulation across the state. In 1882 precise leveling was carried across the state. The Mississippi River Commission had carried the work on along the river. The Missouri River Commission had followed the Missouri River. The United States Geological Survey, from 1884 to 1890, mapped about one-third of the state in the central part. The State Geological Survey is at present engaged in mapping the state chiefly for geological purposes.

Discussion followed by Messrs. Johnson, Moore, Winslow, Ayer, Potter and Capt. Palfrey.

For the meeting of April 6th a paper by Mr. E. A. Hermann on "Steam Shovels and Steam Shovel Work" was announced.

## Engineers' Society of Western Pennsylvania.

The regular monthly meeting of the society was held in Pittsburgh on March 15. Sixteen applicants were elected members.

The meeting was devoted to discussing Mr. Metcalf's paper "On Smoke," read at the February meeting. Mr. J. W. Langley opened the discussion by stating that one side of the smoke question is sometimes overlooked, viz., that certain industries produce smoke necessarily because of the requirements of the material which is being treated. In good practice, steel furnaces do not produce any large amounts of smoke; puddling furnaces, coke ovens and household fires are large producers of smoke. Next to these last is undoubtedly boiler fires; probably in Pittsburgh they equal all other causes of smoke combined, and it is to them that the coming inventor needs to direct his attention. The mechanical stoker can only be used in large establishments, small ones cannot afford them; and it is from the small ones collectively that the greatest part of the smoke comes. A smoke laden atmosphere has one evil effect, and that is that it is mentally depressing; that smoke is injurious to bodily health has never been proved by testimony.

Several smoke consumers were then described by their representatives. After a lengthy discussion engaged in by many of the members, a Committee on Smoke Prevention was appointed, consisting of Messrs. Dempster Johnson, Hyde, Scaife, Langley.

The next regular meeting of the society will be held April 19. Mr. George S. Davison will read a paper on "The Hydraulics of Large Rivers."

## M. C. B. Association.

The Secretary of the Master Car-Builders' Association has issued the following circular from the Arbitration Committee on Revision of Rules: "The Arbitration Committee requests suggestions from members, from railway clubs, and from others interested in the rules of interchange, as to what changes they consider should be made in these rules by the association in convention next June. It is not necessary that the specific matters taken up by the Committee on Joint Inspection as to interpretations of the rules should be mentioned in reply hereto."

## PERSONAL.

—Mr. Marion N. Coe, who has been Secretary of the New Orleans Traffic Association for the last four years, died in that city March 16.

—Mr. John C. Rogers, Agent of the Nickel Plate Fast Freight Line at Memphis, Tenn., died in that city March 15 after a short illness. He was about 30 years old.

—Mr. George Crocker, late locating engineer of the Roanoke & Southern, has been appointed Division Engineer on the new Chicago extension of the Wabash.

—At a meeting of the full Board of the Interstate Commerce Commission, held in Washington, Saturday, March 19, Hon. William R. Morrison was elected Chairman to fill the vacancy made by Judge Cooley's resignation.

—Mr. H. M. Luther, Resident Engineer of the Philadelphia & Reading, at Ashland, Pa., died at Atlantic City, N. J., March 19. He was a brother of Mr. R. C. Luther, Superintendent of the Philadelphia & Reading Coal and Iron Co.

—Mr. E. W. How, Traffic Manager of the Louisville, New Orleans & Texas, is reported to have tendered his resignation to take effect April 1. His successor will probably be Mr. L. T. Day, now Traffic Manager of the St. Louis, Arkansas & Texas.

—Mr. Samuel F. Prince, formerly Mechanical Engineer of the Philadelphia & Reading, and who has been connected with the Long Island road for the last few months in a similar position, has been appointed Superintendent of Motive Power of the latter line, to succeed Mr. Charles A. Thompson, resigned.

—Mr. William H. Blood, who has been Assistant Superintendent of the Long Island road, was appointed General Superintendent this week, to succeed Mr. I. D. Barton, who is now General Superintendent of the New York & New England. Mr. Blood has been connected with the Long Island road since 1878 and has had experience in nearly all departments of railroad service. He began railroad work in 1864 on the Boston & Maine.

—Mr. Charles J. Vandepoele, well known as an electrician and inventor, died last week at his home in Lynn, Mass., at the age of 46 years. He was born in Belgium and came to the United States in 1860. He began the construction of dynamos in 1867 in Detroit, and afterward devoted much attention to the development of his arc-lighting system and to experiments in the propulsion of cars by electricity. In 1888 his company was absorbed by the Thomson-Houston Co. of Boston, and Mr. Vandepoele became an electrician in that company.

—The resignation was announced this week of one of the oldest men in the railroad service, if not the very oldest now living. Mr. John C. Jacobs, Superintendent of the Amboy Division of the Illinois Central, has resigned, to take effect April 1, when he will complete 55 years of railroad service. Mr. Jacobs is now in his 72d year and has been Division Superintendent of the Illinois Central for 30 years. He began railroad work in 1837 on the Baltimore & Ohio, when that road was less than 100 miles long and when there was no other road as long as that. Mr. Jacobs was for a time a section hand, afterward locomotive engineer for eight years, supervisor of engines for a further period and for three years, supervisor of construction on the west end of the Baltimore & Ohio. The Illinois Central has paid Mr. Jacobs' salary up to October next.



—Mr. Walter G. Oakman, President of the Richmond Terminal system, has been elected President of the East Tennessee, Virginia & Georgia, in pursuance of the consolidation schemes. He was also elected Chairman of the Board of Directors to succeed Gen. Samuel M. Thomas. Mr. S. M. Felton, who resigned as President of the road to allow the election of Mr. Oakman, has been chosen Vice-President of the East Tennessee, Virginia & Georgia, and will remain as Vice-President of all the subordinate companies in the system. He will remain President of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern companies. Mr. Felton has been President of the East Tennessee about two years, and his retirement from that post was a necessary part of the reorganization plan.

#### ELECTIONS AND APPOINTMENTS.

**Baltimore & Cumberland.**—At a meeting of the stockholders in Baltimore for organization last week the following directors were elected: Henry G. Davis, D. L. Bartlett, B. N. Baker, John A. Hambleton and T. M. Lanahan, of Baltimore; Buchanan Schley, of Hagerstown, Md., and R. C. Kerens, of St. Louis. The directors elected H. G. Davis, President and C. M. Hendley, Secretary and Treasurer.

**Bangor & Piscataquis.**—At the annual meeting in Bangor, Me., the following directors were elected: Edward B. Nealley, Charles L. Mason, John Cassidy, Llewellyn J. Morse, Isaac Strickland, Joseph W. Taney, Alexander M. Robinson. The directors elected Edward B. Nealley, President; Horatio W. Blood, Clerk and Treasurer; Arthur Brown, Superintendent.

**Chicago, Greenville & Southern.**—The incorporators of this company chartered in Illinois, last week, are: A. C. Morrison, David W. Rider, Francis Hook, William S. Hook and Marcus Hook, all of Jacksonville, Ill.

**Chicago, Rock Island & Pacific.**—Harry Fox, Train Master, has been promoted to the position of Assistant Superintendent of the Iowa Division with headquarters at Des Moines, Iowa.

**Concord Southern.**—The company has been organized with J. M. Odell, of Concord, N. C., President; R. W. Allison, Vice-President, and W. M. Smith, Secretary.

**East Tennessee, Virginia & Georgia.**—W. G. Oakman has been elected Chairman of the Board of Directors and President of the road, to succeed S. F. Felton. The following new directors have also been elected: H. C. Fahnestock, George S. Scott and W. P. Clyde. Gen. C. M. McGhee, who resigned temporarily last week, has been re-elected. The resignations that were made to provide seats for the new directors are also understood to be temporary until a complete rearrangement of the personnel of the board can be effected.

**Fitchburg.**—Governor Russell of Massachusetts has appointed D. P. Kimball and J. Q. Adams as State directors of this railroad.

**Hamilton & Kingston.**—The following are the officers of the reorganized company: Frank Clark, President; John Marens, Secretary, both of Hamilton, Mo., and James A. Rathbun, Treasurer; J. H. Bothhoff, Superintendent, Kingston, Mo., and C. M. Carter, Auditor, St. Joseph, Mo.

**Huntington & Kenova.**—The directors of this new West Virginia Company are: George T. Miller, Jr., G. E. McDonald, George McKendree, J. L. Caldwell, S. T. Vinson, all of Huntington, W. Va., and R. H. Pritchard, of Catlettsburg, Ky.

**Illinois Central.**—W. J. Harahan has been appointed Trainmaster and Roadmaster for the Bloomington, Pontiac & Tracy districts of the Chicago Division, with headquarters at Kankakee, Ill. Mr. Harahan has been with the Baltimore & Ohio Southwestern. He is a son of Vice-President J. T. Harahan.

**Long Island.**—I. D. Barton having resigned the position of General Superintendent, William H. Blood has been appointed General Superintendent in his stead, in charge of the Transportation Department. C. A. Thompson having resigned the position of Superintendent of Motive Power, Samuel F. Prince has been appointed to that position in his stead, in charge of the Motive Power and Machine Shops. Mr. Blood will report to the Second Vice-President and Mr. Prince to the Consulting Engineer.

W. D. Hurlbut has been appointed Assistant General Freight Agent of the Northern and Western lines with office at Chicago, this being merely an extension of his jurisdiction. W. S. Benson, formerly Traveling Freight Agent, has been appointed Commercial Agent, with office at Dubuque, Ia., instead of Assistant General Freight Agent as reported last week.

**Los Angeles Terminal.**—The following directors were chosen at a recent meeting of the stockholders at Los Angeles, Cal.: G. A. Leighton and B. F. Hobart, of St. Louis; and W. H. Workman, D. McFarlane and T. B. Burnett, of Los Angeles. George B. Leighton was elected President. T. B. Burnett, Vice-President, General Manager and Treasurer, and William Winecup, Secretary.

**Mexican National.**—Under the voting trust agreement of Sep. 1, 1887, the bondholders of the company have nominated the following directors to be voted for at the next election: William G. Raoul, Josiah A. Horsey, Charles C. Beaman, Eckstein Norton, William Mertens and Gustave J. Netzer, of the United States, and Emilio Velasco and William Landa y Escandon, of Mexico.

**Monterey & Mexican Gulf.**—R. H. Johnson has been appointed Master Mechanic with headquarters in Monterey, Mex.

**Ottawa & Gatineau Valley.**—The officers of this company are at present as follows: H. S. Beemer, President, Montreal; H. L. Mattley, Secretary and Treasurer, pro tem., 102 St. James Street, Montreal; C. H. McIntosh, Vice-President, Ottawa; T. S. Prince, Superintendent, Ottawa, Ont., and W. Dale Harris, Chief Engineer, Central Chambers, Ottawa.

**Pecos Valley.**—Donald Allen, formerly Division Superintendent of the Houston & Texas Central and later of the Louisville & Nashville, has been appointed General Superintendent of this road, with headquarters at Eddy, Mexico.

**Philadelphia & Bustleton.**—The following are the incorporators: Thomas D. Whitaker, Philadelphia, President; Richard W. Clay, Charles P. Tomlinson, Edward H. Fyle, P. P. Boles, Wm. F. Dixon, John B. Stauffer, Frank I. Patterson and N. Sperring, all of Philadelphia, Directors.

**Philadelphia & Frankford.**—The first Board of Directors of the company has been organized as follows: William W. Foulkrod, Philadelphia, President; William Bault, James Whittaker, William H. Rhawn, David C. Nimlet, Wm. M. Hoerocks and Samuel W. Evans, Jr., all of Philadelphia.

**Pittsburgh & Western.**—The following circular was issued by the company March 15: The relations and agreements now existing between this company and the Baltimore & Ohio Railroad render it desirable for the interest of both that their railroad properties should hereafter be operated practically as one system. The following appointments have therefore been made by this company: J. T. Odell, General Manager; Frank Harriott, General Freight Traffic Manager, and Charles O. Scull, General Passenger Agent, with office at Baltimore, and J. V. Patton, General Superintendent, with office at Allegheny City. The latter officer was formerly General Manager of the road.

**Point Judith.**—The company has been organized in Rhode Island by Jeremiah P. Robinson, Isaac R. Robinson, William G. Roeller, Frank D. Sturgess and Mark W. Maclay, all of New York City.

**Richmond & Danville.**—At a meeting of the Board of Directors last week W. G. Oakman was elected President, vice John H. Inman, resigned. Mr. Oakman resigned as a Director and H. C. Fahnestock was elected in his place. S. M. Inman, of Atlanta, Ga., also resigned, and John H. Inman was elected to succeed him as Director, and George S. Scott, formerly President of the company, was elected a Director to succeed James Swann, resigned.

**Richmond & West Point Terminal.**—John H. Inman having resigned as President of this company, W. G. Oakman has been elected in his place. R. T. Wilson has resigned as a Director and John H. Inman was then elected in his stead, it not being required that the President of the company should serve as a Director.

**St. Lawrence.**—The following are among the first directors of the company: Charles J. Pussey, Robert G. Hervey, Clark R. Griggs and S. D. Schuyler.

**Washington & Chesapeake Beach.**—Several changes have been made in the Board of Directors, the directors being now as follows: Edwin Wardell, F. H. Smith, W. C. Codd, Baltimore, Md.; C. C. Magruder, Marlborough, Md., and H. D. Walbridge, J. G. Slater and B. F. Karns, Washington, D. C. The following are the officers: Herman D. Walbridge, President; Benjamin F. Karns, Vice-President; John G. Slater, Treasurer, and T. W. Tyrer, Secretary.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Astoria & Portland.**—A new charter was filed in Washington last week for the extension of the Astoria and South Coast Road to Hillsboro. The contract has been let for the work to that town. The Astoria and South Coast was recently sold at foreclosure and the new company has been organized by business men of Astoria.

**Atlanta.**—The short branch built through the city this year from the main line of the Western & Atlantic in Atlanta, Ga., and extending to the new water works has been leased by the city for 25 years to the Nashville, Chattanooga & St. Louis or during the continuance of that company's lease of the Western & Atlantic. The line has been graded for a little over a mile, its terminus being near the Chattahoochee River. The track will be laid immediately by the Western & Atlantic.

**Bartow & Plant City.**—This company has been chartered in Florida with J. H. Tatum, President, and B. B. Tatum, Secretary, to build a road from Bartow northwest to Plant City, Fla., a distance of 22 miles. The capital stock is \$220,000.

**Bristol & Northern.**—A reconnaissance was recently made for this road by George S. Bruce, of Bristol, Tenn., north from that town, via Little Moccasin Gap, to a point on the Clinch Valley Division of the Norfolk & Western, near its western terminus. The preliminary survey will probably be made this spring, although the projectors have not yet completed the organization of the company.

**Calumet Belt.**—The company filed articles of incorporation in Illinois last week. The road which it is proposed to construct will extend from a point on the South Chicago Railroad, in Chicago, at the intersection of Erie avenue and South Chicago avenue, in a southerly or southeasterly direction, to a point on the Illinois-Indiana state line in Thornton Township, Cook County, with a branch extending westerly to a point on the Illinois Central road, between Kensington and Harvey.

**Canadian Pacific.**—General Superintendent Whyte, of the Western Division, confirms the report that the company is to begin the construction of a line southwest from Regina in Assiniboia. The survey is begun this week by C. H. Osler, of Kingston, Ont., who will run a line southwest to near the United States boundary, connecting with the Souris branch now being extended from Melita. The line will be about 150 miles long. It is the avowed intention of the company to connect its main line at Regina with an extension of the Minneapolis, St. Paul & Sault Ste. Marie road. The latter company has built a branch to Valley City, N. Dak., but it will require the construction of about 170 miles of road to complete the line to the northern state line.

A press dispatch from Ottawa, Ont., states that the company has notified the Minister of Railways that it proposes to build a second line across the Rocky Mountains and will utilize Crow's Nest Pass for that purpose. Surveyors were in the pass last season and report that locations for three or four lines can be obtained. It was at one time proposed to build the main line through the pass, and in the last few years several companies have been organized to cross the Rock Mountains via Crow's Nest Pass.

**Canadian Roads.**—John J. Macdonald, of Ottawa, and J. G. Boswell, of Toronto, railroad contractors, have petitioned the Dominion parliament for a charter to build a railroad from the Straits of Canoe, on the line of the Intercolonial or Cape Breton Railroad across eastern Nova Scotia, to the ports of Louisbourg or Sydney.

**Carabelle, Tallahassee & Gulf.**—The contract for building about 10 miles of the road from the terminus near Carabelle toward Tallahassee, Fla., is reported to have been let to W. R. McIntyre, and W. H. Mitchell, of Savannah, and J. H. Davidson, of Metcalfe, Ga.

**Chicago, Burlington & Quincy.**—The eastern officers of the company state that the reports of an extension of the line through the Black Hills in South Dakota have only this basis: That the company has let a contract for the building of eight miles of road into the Rubie Basin at the Black Hills. This is all the extension the company contemplates at present at this place. It is, however, laying the rails upon some 50 miles of completed grading to carry its Northwestern extension west of Gillette to the foot of the mountain in northwestern Wyoming, east of Buffalo.

**Chicago, St. Paul & Kansas City.**—The officers of this company are said to have recently made a proposition for an extension of the branch road now terminating at Manly Junction, south to Mason City, Ia., a distance of 12 miles. Since the contract with the Iowa Central for trackage rights over that line to Mason City was abrogated, the operation of the branch only to Manly Junction is not very profitable.

**Chicago Union Elevated.**—The company was incorporated in Illinois last week to build several miles of elevated road in Chicago, the main line to extend from a point on Franklin street, between Madison and Twelfth streets, thence to the western limits of the town of Cicero, with a branch running north to Milwaukee avenue and the northern limits of the city.

**Cleveland Belt & Terminal.**—Superintendent Wardwell, of the Cleveland & Canton, which is to build this eight-mile belt line at Cleveland, O., states that the construction of the road will be resumed as soon as the weather permits. The first work to be done will probably be to lay the track on the road graded last fall. The balance of the line will be completed in a few months, as all the right of way has been secured except from about half a dozen property owners, against whom condemnation proceedings are pending.

**Coal River Valley.**—The survey for the line south of St. Albans, W. Va., is to be made by W. C. Reynolds, of Charleston, and the engineers will begin this work immediately, as already reported. The preliminary survey will be made for about 20 miles along the Coal River this spring, and it is proposed to build this section during the year.

**Colorado Midland.**—In regard to the survey between Hayden and Cripple Creek, Col., it is reported that a party of engineers began work on this survey over two weeks ago. They have run three preliminary lines and located one line about 3½ miles long. The work they are engaged on is principally an exploration, as it is impossible to say, without a survey, whether a feasible line can be obtained from Hayden Divide. Thirty days will be consumed probably deciding this question.

**Dardanelle & Mount Nebo.**—The company organized last year in Arkansas to build the road up Mount Nebo has been reorganized and a new charter was filed this week. The contract has been let to Theodore Hartman and Joseph Evans, to complete the line between Dardanelle, Ark., on the White Black River road, to Mount Nebo. The grading and tracklaying and the incline up the mountain is to be completed in three months. W. J. Thompson is General Manager.

**Denver & El Paso.**—Articles of incorporation were filed in Colorado last week, the incorporators including the committee recently chosen at the meeting of projectors at Denver. It is proposed to build a road from Denver to El Paso, Tex., via Colorado Springs, Pueblo and Trinidad in Colorado, and Las Vegas and White Oaks in New Mexico.

**Duluth & Iron Range.**—The survey for the branch line to the Messabe iron range has been completed, and contractors are now estimating on the work. The branch will leave the main line about four miles south of Messabe Station, and will be nearly 20 miles in length, passing through the town of Merritt to the Canton mine. It is probable that this branch will be extended to the Kenawha, Cincinnati, Iron Cliff and other mines. A branch may also be built to the eastern end of the range. Last year five miles of 80-lb. steel was laid, and this year 25 miles more will replace lighter rails on the main line.

**Duluth, Messabe & Northern.**—It is the intention of Messrs. Grant, Foley & Guthrie to break the record in railroad construction on this work. The work is not very heavy, but there is a large amount of bridge work which is already under contract. The line will admit of hauling full trains, as the maximum grade approaching the mines is 26.4 ft. to the mile; the maximum grade from the mines is 20 ft.; maximum curvature, five degrees. Sixty pound steel will be used. One branch extends from the main line in T. 57, R. 18, N. E. to the Biwabik mine in T. 58, R. 16, with a three-mile spur to the town of Merritt. Another branch from the main line in T. 58, R. 18, to the Messabe Mountain mine, in T. 58, R. 17, five miles in length, will be built. The matter of location of terminals is still unsettled, but it is very probable that they will be located on the Minnesota side of St. Louis Bay. The citizens of Duluth are now considering voting \$500,000 of bonds to aid in procuring right of way and terminals in Duluth for the joint use of the Duluth & Winnipeg and the Duluth, Messabe & Northern.

**Duluth, Red Lake Falls & Northern.**—It is denied that the land recently sold at Stony Point, between Duluth and Two Harbors, was purchased by this road. President J. B. Holmes says the road is ready to build as soon as it secures terminals in Duluth.

**Eastern Railway & Terminal Co.**—Articles of incorporation of this company will probably soon be filed in Colorado, and it is claimed that the organization of the railroad is now nearly complete. The projectors secured a valuable right of way along Cherry Creek from the Denver Council, a few months ago. The franchise has recently been revoked by a new board, but the projectors expect to prove the invalidity of that action, and the litigation is now pending in the state courts. It is proposed to build a line along Cherry Creek to near Sullivan, and thence to Sand Creek, where connection will be made with the Kansas Pacific.

**Forest Central.**—The location for this line east of Tionesta, Pa., has recently been decided upon, and it is proposed to build 15 miles of the road this year. The line will be of 3-ft. gauge extending from Tionesta on the Allegheny River northwest along the Tionesta River through the towns of Nebraska and Newtown to Kellettsville on the Pittsburgh & Western, with a branch to Marienville in Forest County. Contracts for the grading will be let very soon, but that work will be light, the maximum grades being only 16 ft. to the mile, with maximum curves of 10 degrees. Two bridges are to be built, one 600 ft. long and the other 260 ft. long. The former will probably be a wooden Howe truss. F. F. Whittaker, of Tionesta, Pa., is President.



**Galveston Terminal.**—This company has been organized by D. H. Perky, who recently purchased the franchises and property of the Galveston & Western. The 15 miles of road already built is to be made standard gauge, new equipment is to be added, and an extension beyond Laflite may be undertaken.

**Helena & Castle.**—A charter was filed in Montana last week for this company by J. H. Lawrence and others, of Helena, Mont., who propose to build the road between Helena, White Sulphur Springs and Castle, now being surveyed by Gen. W. A. Haven. His engineers have surveyed about 20 miles of the route near the Belt Mountains, the principal work to be done being to secure a feasible pass over the mountains. The three towns have subscribed about \$240,000 for the construction of the line, \$165,000 being raised at Helena. This fund is to be awarded to any company that will build the 110 miles of road to the mines at Castle and White Sulphur Springs. The line proposed crosses the Missouri River about 10 miles from Helena and extends easterly, crossing the Belt Mountain range and through the Smith River Valley to White Sulphur Springs, thence southeast around Castle Mountain to the town of Castle.

**Houston Belt.**—R. H. Harrison, of Columbus, Tex., who is the projector of a new belt line to be built at Houston outside of the corporation limits, states that the organization of the company will be completed in May. He proposes to begin the locating survey shortly, and expects to have the line in operation in September. The line will connect with all the roads which now reach Houston, and with the various cotton compresses and the wharves along the river front.

**Huntington & Kenova.**—The charter of this company was filed in West Virginia last week, for the construction of a road from Huntington to Kenova, in Wayne County, W. Va., a distance of about eight miles. The capital stock is \$300,000. The charter is probably filed to cover the extension of the Ohio River Railroad to connect with the Norfolk & Western at Kenova, which has been under construction for several months and is now nearly completed.

**Hutchinson & Southern.**—A press dispatch records the letting of contracts to Henry McTighe and others for an extension of this line through the Indian Territory to begin at the Kansas state line south of Anthony, Kan. It is to extend through Guthrie, Ok. Terr., to Denison, Tex., the distance being given as 320 miles.

**Jacksonville & Mayport.**—Horace Scott, of Louisville, and J. D. Lyle were recently awarded a contract for completing this short line in northern Florida, of which J. N. C. Stockton, of Jacksonville, Ala., is President. They are now arranging to begin the grading in a few weeks and build the road from Mayport through Duval County.

**Jonesville & Lockhart Shouls.**—A survey is to begin in a few days for the road between Jonesville and Lockhart Shouls, S. C., a distance of about 16 miles. The road will be on a level plateau for most of the distance and will be easy to construct. The towns of Jonesville and Pinckney in Union County have each voted a subscription of \$20,000 to the company. Charles D. Farrar, of Jonesville, is President.

**Lake Hopatcong, Boonton, Morristown, Caldwell & New York.**—This road was organized nearly two years ago at Morristown, N. J., to build a road from Caldwell to Morristown. Right of way was secured, surveys made and local subscriptions received, but the project went no further. A reorganization of the company has occurred and many of the original directors have been retained. Hon. Augustus Cutler, of Morristown, has been chosen President, and both New York and local capital has been interested. New surveys have been made and the line as at present laid out will extend from Essex Falls to Roseland, to Whippany, Boonton and Rockaway, with a branch from Whippany to Morristown. Agents have secured most of the right of way. C. C. Vermeule, 71 Broadway, New York, is Chief Engineer.

**Marquette & Western.**—This project is gradually assuming a more definite shape, and several of the towns west of Marquette, Wis., have agreed to grant right of way for the road and to issue bonds to aid its construction. A reconnaissance was made by a party of engineers early in the spring over most of the route between Marquette and Abbottsford, and steps are now being taken to begin the preliminary survey. The company was organized by the business men of Marquette to build a road from that town, on Green Bay, west along the Marquette River and thence toward Abbottsford.

**Memphis & Pensacola.**—Contracts have been recently let to Harris Dishman for about 11 miles of the line in Southern Tennessee, and the projectors state that they expect to have about 65 miles of the line south of Memphis under contract by May 1. The company has been recently reorganized, and it is thought that considerable work will be done this summer by the new company. A survey is now being made from Memphis by Henry McLoughlin, Chief Engineer.

**Mexican Central.**—Engineer Kain has completed the reconnaissance of the route of a proposed extension of the Pachuca branch to Tampico. The line would touch the towns of Actopan and Santiago, and follow the Amajac River as far as its confluence with the Motezuma. From that point on, the grades are light and the river could be easily crossed to connect with the present Tampico Division, about 30 miles west of the port. The length of the proposed line, from Tula to its junction with the Tampico Division, would be about 280 miles and the maximum grade 2 per cent.

**Mexican Roads.**—Two routes have been surveyed for the proposed road between Durango and Mazatlan, Mex. The line now being considered beyond Durango, crosses the Chico River at San Pedro and extends to Aguinalco, and along the cañon Espiritu Santo, which will give an easy descent to the river San Diego, which it follows to Acaponeta.

**New Roads.**—The project for a railroad from Sioux City through Woodbury County, which was first proposed a number of years ago, has been revived, and there is said to be a prospect of some work being done this year. It is proposed that Sioux City or Woodbury County issue bonds to build the road to the county line east of Sioux City to connect with several of the Chicago roads, and to operate the line or lease it to an existing company.

L. H. Fitzhugh, of Dallas, Tex., who is interested in the project to build a road from Victoria, Tex., to the west end of St. Joseph's Island, near Aransas Pass, has submitted a proposition for the construction

of the line, provided a cash donation of \$50,000 and 22,000 acres of land is made by the county.

The surveys which were begun some time ago by the Retsof Salt & Mining Co. have been completed and the engineer estimates that the cost of building the road from Retsof to Genesee, N. Y., will be about \$84,000. The line will connect with the New York, Lake Erie & Western and will be but a few miles long. The company says that its construction has not yet been decided upon, but if the towns will undertake part of the cost of construction it will probably be built.

**Newton & Canaan.**—The company has been organized in West Virginia by A. W. Winchester and others, of Buckhannon, for the purpose of building a road from Newton, Upshur County, W. Va., to the headwaters of the Little Kanawha River. The capital is \$5,000, and the line is practically one of the several logging roads built by the Buckhannon River.

**Norfolk & Carolina.**—A survey was begun this week by the engineers of the company for a line to Albemarle Sound. The survey was begun at Aulander, N. C., near Tarboro, and will extend southeast through Windsor to Avoca, N. C., a distance of about 44 miles. The road is now operated as part of the Atlantic Coast Line, and the new branch will probably be built by that system.

**Norfolk & Western.**—Grading will be started at once on a short extension of the Big Tom Branch, which leaves the Clinch Valley division at Coeburn, Va. The contract for constructing the line has been let to V. H. Vaughan, of Roanoke, Va. The branch will open up a large coal field, and arrangements have already been made by a number of operators for shipments to begin as soon as the line is completed.

**Ottawa & Gatineau Valley.**—The Chief Engineer in reporting the present condition of the work on this line writes that the first 20 miles north of the Ottawa River, beginning at Hull, Quebec, is in operation; that 10 miles additional has been graded but not ballasted, bringing the terminus above Wakefield, and that the next 20 miles is now under construction, the work being done by day's labor. The balance of the 30 miles to the northern terminus at Le Desert has been surveyed. The tracklaying was suspended on Jan. 10, when the last 10-mile section was completed, and will probably be resumed on the graded section this spring. The road extends along the west side of the Gatineau River through the towns of Ironside, Chelsea, Wakefield and Low, and thence northwesterly to Le Desert, passing through Aylwin, Kazubazua, Pickanock and Blue Sea in Quebec. The work now remaining to be done is generally light, with maximum grades of two per cent, and maximum curves of 10 degrees. The bridge work is unimportant, consisting only of three or four plate girders. The company has a subsidy from the government for the first 62 miles of about \$10,500 per mile, and 6,000 acres of land for each mile of road built.

**Pennsylvania.**—A considerable force of men is now working on the new branch from Allen Lane Station on the Chestnut Hill branch north of Philadelphia to a connection with the Trenton branch, near Fort Washington. The work is being pushed vigorously on the entire branch, especially at the southern end near Main street, where the excavation and filling work is heavy.

**Philadelphia Belt Line.**—An agreement is reported to have been made by the officers of the Belt Line and of the Pennsylvania looking to a modification of the injunction issued against the Belt Line in January preventing it from constructing its line along the Delaware River front in Philadelphia, between Callowhill and South streets, about eight city blocks. The Belt Line is understood to have been offered trackage rights over the (Pennsylvania) River Front tracks on this street until the avenue has been widened by the harbor improvement. The Belt Line has been partly completed below South street, and if this arrangement is concluded it will probably enable it to build its line without further interruption.

**Philadelphia & Bustleton.**—The company was chartered in Pennsylvania last week to build a line about eight miles long through Philadelphia County. The line is to begin at a point in the Thirty-third ward of Philadelphia, near Front and Erie Avenue, and extend thence in a generally northeasterly direction to a point in the Thirty-fifth ward near the junction of Hoff and Boriau streets, in Philadelphia. The capital stock is \$200,000. T. D. Whitaker, of Philadelphia, is President.

**Philadelphia & Frankford.**—A charter for the company was secured in Pennsylvania this week, the capital stock being \$400,000. The new line will extend from a point on the Philadelphia, Newtown & New York road, near Crescentville station, to a point on the west side of Frankford road, between Unity and Sellers streets, Philadelphia. This is one of the new suburban lines projected by the Philadelphia & Reading in the district north of Philadelphia. The length of the line will be 2½ miles. W. W. Foulkrod, of Philadelphia, is President.

**Philadelphia, Wilmington & Baltimore.**—Caroline County, Md., by a law which was passed by the Maryland legislature at its present session, was authorized to issue \$60,000 of county bonds for the proposed road from Greensboro to Federalburg, Md. The line was surveyed last summer by engineers of this road for a local company. The passage of this bill has revived new interest in the project, and the local directors are securing right of way and will soon make a proposition to the Pennsylvania officers for the construction of the road. It will be about 40 miles long, extending from Greensboro south through Denton to Federalburg and will connect at both places with the Philadelphia, Wilmington & Baltimore.

**Pittsburgh & Lake Erie.**—Tracklaying has been begun on the coal branch which is being built from a point on the main line of this road near Pittsburgh up the Monongahela River, a distance of about five miles.

**Point Judith.**—The company has applied for incorporation in Rhode Island to construct a railroad, commencing at a point near the Providence & Stonington railroad or the Narragansett Pier Railroad, within the town of South Kingstown, and thence leading to the Atlantic Ocean at the extremity of Point Judith.

**St. Lawrence.**—Articles of incorporation were filed in New York this week for this company, which proposes to operate six miles of road from the American frontier in St. Lawrence County, to connect with the Utica & Black River Railroad. The capital is \$60,000.

**Sandusky & Columbus Short Line.**—The first of the contracts which are to be let this spring and summer was awarded last week to Stearns, Hoover & Co., of Columbus. The contractors will next week begin ballasting the 12 miles of graded road between Sandusky and Bellevue. The engineer corps has been organized

and resident engineers for all the sections have been appointed. The right of way agents have been at work for some time. It is proposed to complete the line this year to Columbus, which will mean the construction of about 100 miles of road. The surveys have been completed, and, as before reported, the line will extend south from Sandusky through Bucyrus, Marion and Delaware to Columbus. The route adopted is the middle one of the several surveyed, and parallels the Cleveland, Cincinnati, Chicago & St. Louis from Berlin to Columbus; about 20 miles. The company will use the terminals of the latter road in Columbus under the contract with the Columbus, Shawnee & Hocking line. F. J. Aid, of Marion, O., is Chief Engineer.

**San Joaquin Valley.**—First mortgage bonds to the amount of \$520,000 have recently been issued to the Metropolitan Trust Co., of New York, to cover the portion of the road completed between Fresno and Pollasky, Cal. The company has now secured the right of way for nearly 40 miles northeast of Fresno, and additional contracts for grading will soon be let.

**Seattle & Everett.**—This company was recently organized in western Washington to build a railroad to Everett on the Snohomish River from a point north of Seattle. The charter for the line was filed last week, the capital stock being \$500,000.

**Sioux City, Chicago & Baltimore.**—A charter for this company was filed in Iowa this week by directors of the Sioux City Terminal road. It is proposed to build a road from Sioux City to the Mississippi River, between Savannah and Muscatine; also southeast from Sioux City to the Mississippi River, between Keokuk and Lyons; from Sioux City to the southern boundary of Iowa, between Fremont and Van Buren counties, and also northeast to a point between Howard and Osceola counties.

**Southern Pacific.**—The construction work on the Redlands branch in San Bernardino County, Cal., has been recently completed and the line will be ready for operation this week. The new line begins at a point east of Colton, near Redlands Junction (formerly Nant), and extends through the town of Redlands to Crofton, a little over seven miles.

**Toledo, Ann Arbor & North Michigan.**—Construction will begin on the second track work between Toledo and Alexis, a distance of five miles, as soon as right of way can be secured.

**Union Pacific.**—J. C. Davis, of Rawlins, Wyo., and others interested in the Kearney stone quarries near that town, have organized a local company to build a road, to the quarries, four or five miles from Rawlins. The company is to complete the grading, which will cost about \$30,000, and the work is then to be finished by the Union Pacific, which has agreed to operate the branch.

**Washington & Chesapeake Beach.**—The survey for the line between Washington and Chesapeake Bay which was begun early this year will be completed on March 26. The line is nearly direct, except at the Patuxent River, and extends from a connection with the Baltimore & Potomac just east of Washington southwest through Upper Marlboro to Chesapeake Beach, a distance of about 30 miles. The construction work will be very easy, the maximum grade being 1½ per cent., and the maximum curvature 1½ degrees. There will be only one bridge on the line with a 60 ft. draw. Bonds have been issued for building the road by the improvement company owning the land at Chesapeake Beach, and it is reported that enough of these have already been sold to complete the 30 miles of road to Chesapeake Bay. T. W. Tyrer, of Washington, D. C., is the Secretary and Manager.

#### GENERAL RAILROAD NEWS.

**Albany, Florida & Northern.**—It is reported that the Savannah, Americus & Montgomery has recently made a new agreement with this company, under which it guarantees the outstanding first mortgage six per cent. bonds amounting to about \$840,000, and in to arrange for their retirement at maturity. The road is about 35 miles long, and extends from Cordele to Albany, Ga. It has been operated since June, 1891, by the Savannah, Americus & Montgomery.

**Baltimore & Cumberland.**—A special stockholders' meeting was held in Baltimore, March 21, and the amendments to the company's charter recently passed by the Maryland legislature were formally accepted. The directors were authorized to issue \$900,000 of the new stock, making the capital stock \$1,000,000, and this amount was subscribed at the meeting.

**Baltimore & Ohio.**—The summarized statement of February earnings for the entire system is as follows:

	1891.	1892.	Inc. or dec.
Gross earnings.....	\$1,709,080	\$1,845,079	I. \$135,999
Oper. expenses.....	1,236,296	1,476,192	I. 239,896
Net earnings.....	\$482,784	\$368,887	D. \$113,897
The earnings for the five months were:			
Gross earnings.....	\$9,861,828	\$10,509,317	I. \$647,489
Oper. expenses.....	7,020,252	7,775,641	I. 755,388
Net earnings.....	\$2,841,576	\$2,733,676	D. \$107,900

**Bangor & Piscataquis.**—The city government of Bangor, Me., is arranging for the transfer of this line to the Bangor & Arrostook, in accordance with the vote at the recent town election, which was in favor of accepting the offer made by that company. The line to be leased was built with city funds and extends at present from Oldtown to Greenville, Me., 77 miles. The road has never been successful, and since the construction of the Dexter branch of the Maine Central in 1889 the charges against the city have been heavy. Under the new arrangement the city receives a sum about equal to the net earnings since the opening of the Dexter branch.

**Central of Georgia.**—President Oakman, of the Richmond Terminal system, has notified General Alexander, the temporary receiver, that the Richmond & Danville will not operate the Central of Georgia after the discharge of the temporary receivership. Neither the Richmond & Danville nor the Richmond Terminal Co. will intervene in the proceedings regarding the receivership, and the Richmond & Danville, which operated the road previous to the appointment of a receiver, will not resume charge of the operations of the company. While it had charge of those operations the Richmond & Danville put a good deal of money in the property, which now stands in the shape of an unsettled account. The Richmond Terminal Co. will simply stand in the position of a large stockholder in the property. The road will be managed, as it was before the lease, by its own board of directors, a



majority of whom reside in the locality through which the road runs. The lease to the Georgia Pacific was in perpetuity, seven per cent. on the stock being guaranteed. General Alexander says that the directors will insist that the lease be maintained in accordance with its provisions.

**Central New England & Western.**—An application of the Receiver, K. O. Sherwood, for authority to issue \$300,000 of receiver's certificates to pay off the indebtedness and make the necessary repairs was argued in the Supreme Court at Brooklyn, N. Y., last week. Decision was reserved, a number of stockholders opposing the motion.

**Charleston, Sumter & Northern.**—The bondholders' committee announces that a majority of the first mortgage bonds have been deposited with the Atlantic Trust Co., and that April 5 is the last day when such bonds can be received for deposit.

**Chicago Elevated Union Terminal.**—The transfer of the land and other property owned by the Atchison, Topeka & Santa Fe in Chicago to this company was made last week and was recorded on Saturday. The Atchison received about \$8,000,000 for the property. The transfer included about 400 acres of land and seems to have covered all the real estate of the Atchison in Chicago. This transfer is pursuant to a contract made some time ago.

**Chicago Great Western.**—The directors of the Chicago, St. Paul & Kansas City met in St. Paul on March 22, and ratified the lease of its property to this company. More than two-thirds of the stockholders have already approved the lease, which takes effect July 1. The new stock to be issued will amount to \$3,000,000, which will be expended during the next two years in extensions and betterments, purchase of real estate and new equipment.

President Stickney states that by the arrangement which has been made about \$10,000,000 of the bonded indebtedness will be converted into stock of the new company, thus reducing the interest charges by about \$450,000 a year.

**Cornwallis Valley.**—Negotiations for the transfer of this road to the Windsor & Annapolis have been about completed, and the details of the negotiations will probably soon be arranged, so that the actual transfer can be made in a few weeks. The road was opened in January, 1891, between Kingsport and Kentville, N. S., 14 miles, and it is believed that it can be operated more economically by the Windsor & Annapolis, with which it connects at Kentville, than as an independent line.

**Delaware & Hudson Canal Co.**—The company has decided to create a new mortgage of \$2,000,000 upon the Adirondack Railroad, the control of which was acquired in 1889. The Delaware & Hudson recently secured all the stock, and the new mortgage is to provide for the repayment of advances. There will be \$1,000,000 fifty-year 4½ per cent. bonds issued under the mortgage, with the Delaware & Hudson's indorsement, and it is understood that Kuhn, Leeb & Co., of New York, have taken the bonds.

**Florida Southern.**—This road was purchased at foreclosure sale last week at Jacksonville, Fla., by the attorneys of the Jacksonville, Tampa & Key West road. The foreclosure was in a suit brought by the New England Trust Co. and the American Loan & Trust Co., of Boston, trustees, respectively, of the bonds of the main line and of the Charlotte Harbor Division. The former bonds amount to over \$2,113,000, and the latter to \$790,000. The road has been in control of the Receiver since March, 1890, and has been operated by the Jacksonville, Tampa & Key West since January, 1890.

**Galveston, Harrisburg & San Antonio.**—A New York stockholder owning about \$350,000 of stock has made application in the United States district court this week for the appointment of a receiver for this road, and also for an injunction restraining the directors of this company and of the Southern Pacific and of the Southern Development Co. from transferring any stock or bonds of the company or enforcing the payments of such bonds or stock. It is complained that \$3,000,000 of the bonds issued for the extension from San Antonio to El Paso are invalid.

**Hamilton & Kingston.**—The road between Hamilton and Kingston, Mo., was sold under foreclosure in the latter part of February, and the charter recently filed in Missouri was for the company which has been organized to succeed the old road which was known as the Haines, Hamilton & Kingston.

**Intercolonial.**—In the estimates recently laid before parliament by the Canadian government are included an appropriation of \$354,000 on capital account for this road. The sum of \$70,000 is also asked for a ferry between Mulgrave and Point Tupper, on the Cape Breton road. The appropriation for the road includes \$152,000 to be expended in enlarging the terminal facilities at Halifax, and about \$121,000 for similar purposes at St. John, and also \$20,000 for rolling stock.

**Lake Erie & Western.**—The principal figures of the annual report this week were published this week and show gross earnings amounting to \$3,273,355; operating expenses, \$1,825,475; net earnings, \$1,447,880; surplus for income account, \$929,058; for corresponding period, 1890, \$796,403.

**London & North Western, England.**—The following is the half-yearly report for six months ending Dec. 31, 1891 (£1 equals 45) capital paid up \$522,633,225. Miles worked 1880:

**Earnings:**  
Passengers.....\$10,693,615  
Freight.....10,292,015  
Minerals.....6,346,990  
Live stock.....673,465  
Parcels, horses, carriages and dogs.....2,065,765  
Mails.....467,450  
Rents.....570,410  
Dividends.....457,280  
Balance brought forward from previous half year.....445,530

**Expenses:**  
Working expenses.....\$17,000,470  
Interest paid on debenture stock.....2,600,480  
Dividends proposed: 4 per cent. per annum on guaranteed and preference stocks, and 7½ per cent. per annum on consolidated stock.....11,332,440  
Chief rents, leases, etc.....536,585  
Balance carried forward.....460,545

Number of passengers carried during the six months.....34,356,756  
Tons, freight, etc.,.....15,096,035  
Mileage of passenger trains.....11,532,323  
" freight and mineral trains.....10,735,980

**Pennsylvania.**—The statement of the business of all the lines east of Pittsburgh and Erie for February, as compared with 1891, shows an increase in gross earnings of \$467,777, in expenses of \$204,815, in net earnings of \$262,962. The two months of 1892, as compared with the same period of 1891, show an increase of gross earnings of \$175,043, in expenses of \$254,748; decrease in net earnings of \$109,705. All lines west of Pittsburgh and Erie for February show an increase in gross earnings of \$543,655, in expenses of \$293,472, in net earnings of \$250,183. The two months of 1892, as compared with the same period of 1891, show an increase in gross earnings of \$728,563, in expenses of \$536,236, in net earnings of \$192,327.

**Pittsburgh, Shenango & Lake Erie.**—A mortgage for \$150,000 was issued this week in favor of the Fidelity Trust Co., of Philadelphia. The bonds are issued by the Erie Terminal Co., and the funds raised are to be used in completing the terminals on Lake Erie and in building the road through Erie, Pa.

**Roanoke & Southern.**—The stockholders of the company met at Roanoke, March 16, and ratified the lease of that road to the Norfolk & Western for a period of 90 years.

**Texas & Pacific.**—The annual report for the last fiscal year was issued last week, and shows, as anticipated, that the company did not earn interest on the second mortgage income bonds due March 1. The surplus over fixed charges is only \$3,019. The statement is as follows:

	1891.	1890.	Inc. or dec.
Gross earn.....	\$7,225,462	\$7,327,710	D. \$102,248
Oper. expenses.....	5,525,531	5,972,344	D. 446,731
Net earn.....	\$1,700,571	\$1,655,366	I. \$45,505
Other income.....	96,150	151,156	D. 55,006
Total net.....	\$1,797,020	\$1,806,522	D. \$9,502
Fixed charges.....	1,764,000	1,953,212	D. 189,212
Surplus.....	33,020	Def. \$146,690	I. \$179,709

Interest charges were the same as last year, \$1,279,490, rentals, \$68,904, car trusts, \$131,000, new equipment, \$11,967, against \$172,783 the previous year. Passenger traffic earnings increased \$31,387, and freight revenue decreased \$173,559. The rate per ton per mile was the same as last year, 1.26c., and passenger rate per mile 2.7c. against 2.61c. last year. The expenditures for betterments, \$475,506, were charged about equally to operating expenses and income account.

The accounts were examined for the income bondholders by auditors, who reported that the company had not earned sufficient funds applicable to the bonds, to pay interest, and suggested a few corrections in the accounts. The membership of the committee of five, who are to examine the property in the interest of the bondholders, is not yet complete.

**Union Pacific.**—The financial statement for January is a favorable one, increases being shown in both gross and net earnings over a month of large earnings in 1891. The earnings in January, 1890, were \$2,500,236 gross and \$376,012 net, but in that month there was serious interruption to traffic by storms. The report follows giving comparisons with 1891:

	1892.	1891.	Inc. or Dec.
Mileage.....	1,425	1,122	I. 303
Gross earnings.....	\$453,748	\$632,663	D. \$178,915
Oper. expenses.....	331,946	338,331	D. 7,725
Net earnings.....	\$121,142	\$296,332	D. \$175,190

**UNION PACIFIC, DENVER & GULF.**  
Gross earnings.....\$443,011  
Oper. expenses.....338,069  
Net earnings.....\$104,942

Surplus.....\$83,371  
The decrease in gross earnings of the Oregon Railway & Navigation Co. was \$189,038, and in net, \$125,280. The St. Joseph & Grand Island increased, \$46,770 in gross and \$37,624 in net earnings. These are included in the following statement:

	1892.	1891.	Inc. or Dec.
Mileage.....	7,671	7,668	I. 3
Gross earnings.....	\$3,050,168	\$3,425,792	D. \$375,624
Oper. expenses.....	2,113,419	2,053,135	I. 60,284
Net earnings.....	\$937,048	\$992,656	D. \$55,608

The gross earnings of the Central Branch and of one half joint mileage were \$77,363 and net earnings \$75,208:

	1892.	1891.	Inc. or Dec.
Gross earnings.....	\$3,214,128	\$3,115,376	I. \$98,752
Operating expenses.....	2,214,799	2,131,896	I. 82,903
Net earnings.....	\$999,328	\$983,580	I. \$15,748

## TRAFFIC.

### Chicago Traffic Matters.

CHICAGO, March 23, 1892.

The Atchison and Alton are again accusing each other of cutting the St. Louis-Chicago rate and the latter announces that it proposes to meet any cuts of the former. Of course each strenuously denies that it is cutting the rate, but says it has evidence that the other is doing it. The Western Passenger Association considered the matter at its meeting Monday, but took no action.

The Central Traffic lines have renewed the fight against the Chicago, Milwaukee & St. Paul and Chicago & Northwestern, because the latter bill east many shipments originating in this city, fixing the billing so that the eastern lines receive a proportion based on the established percentages on Milwaukee and Chicago, which in some cases amount to more than the switching charges. The eastern lines have now agreed to serve written notice on the two offenders that they will abrogate all existing percentage divisions on this business on April 1st.

The Atchison, Topeka & Santa Fe has filed with the Advisory Board of the Western Traffic Association the following notice concerning Pacific coast passenger rates:

"Inasmuch as excessive, unusual and extraordinary reductions have been made in this business under the pretense of commissions, amounting to \$20.70 per ticket from Chicago and common points, and correspondingly from Mississippi River points and from Missouri River points to the Pacific coast, thus reducing the regularly established rates nearly 50 per cent., application was made by the Atchison, Topeka & Santa Fe Railroad Co. and its proprietary lines for permission to establish a rate which would give passengers the benefit of such excessive reductions, which relief was denied, and on appeal to the Commissioners was also denied by reason of the inability of the Commissioners to agree, after a full hearing, notice is hereby given to the Advisory Board, and to all members of the Western Traffic Association that, pursuant to the

provisions of section 3, article 8 of the by-laws of the Western Traffic Association, adopted by the Advisory Board, the Atchison, Topeka & Santa Fe Railroad Co. will establish a rate on second class passenger business to the Pacific coast, as follows: From Chicago and common points, \$7.45; from Mississippi River points, \$9.30; from Missouri River points, \$14.30 per passenger, which rate will take effect on the 15th day of June, A. D. 1892.

(Signed) "A. MANVEL, GEO. C. MAGOUN,  
Members of the Advisory Board of the Western Traffic Association for the Atchison, Topeka & Santa Fe Railroad Co."

The Atchison has also taken a formal appeal to the advisory Board from the recent decision of the Commissioners refusing to authorize the reductions, and the appeal will be heard at the April meeting of the Board. It is probable that at the same time the whole subject of commissions will be again considered, and it is not unlikely that a new agreement will be reached which will be satisfactory to the Santa Fe and result in the withdrawal of the notice of reduction. In case no agreement is reached it is believed that the reduced rates will go into effect as announced.

The Kansas roads have been served with another injunction, this time by the United States court, upon the application of the Wichita jobbers, restraining the Santa Fe and Missouri Pacific from withdrawing the compromise tariff which had been filed with the Interstate Commerce Commission, to become effective March 16. As the matter now stands the State court has restrained the roads from publishing the rates ordered by the State Railroad Commissioners, and the United States court has forbidden them to withdraw the compromise rates which they had agreed to, and which subsequently they had decided to withdraw because they were not satisfactory to the lines east of the Missouri River.

### Traffic Notes.

The Northern Pacific will on April 3 resume the running of two daily passenger trains each way between St. Paul and the Pacific Coast.

The Salt Lake City Chamber of Commerce has made formal complaint to the Interstate Commerce Commission regarding freight rates from Missouri River points to that city.

The Pennsylvania has announced the reduction of the fare between Cincinnati and Chicago from \$8 to \$6, claiming that its competitors have been cutting rates by means of mileage tickets and other irregular practices.

The General Freight Department of the Union Pacific has compiled a statement of the acreage and condition of winter wheat in Kansas showing that in the 32 counties traversed by the road the number of acres is 1,447,000, an increase of 100,000 over last year's acreage.

Manager J. S. Leeds, of the California Traffic Association, has submitted a formal statement to the Railroad Commissioners of that state showing that rates on grain and other important commodities are in general 25 per cent. higher than for similar distances in Kansas. He does not demand a specific reduction, but asks the Commissioners to take action under their constitutional powers to establish freight rates.

The percentages of tonnage and revenue on all traffic carried by the lines in the Southwestern Missouri River agreement through Kansas City, Leavenworth, Atchison and St. Joseph for the month of December, 1891, are just issued, and are as follows:

Line.	Tonnage.	Revenue.
Atchison.....	18.5	21.0
Alton.....	9.6	16.6
Burlington.....	22.6	29.3
St. Paul.....	5.0	6.6
Rock Island.....	9.3	10.2
C. St. P. & E. C.....	7.3	8.0
Wabash.....	9.1	9.1
Mo. Pacific.....	18.8	15.2
	100.0	100.0

The percentage of the total tonnage and revenue through the same gateways, via the same lines, for the year 1891, is as follows:

Line.	Tonnage.	Revenue.
Atchison.....	22.1	22.4
Alton.....	11.7	12.6
Burlington.....	18.3	17.8
St. Paul.....	6.2	7.3
Rock Island.....	10.8	11.3
C. St. P. & E. C.....	6.6	6.9
Wabash.....	9.2	8.7
Mo. Pacific.....	15.1	12.0
	100.0	100.0

At Los Angeles, Cal., the scalpers are said to be selling tickets to Kansas City for \$15, and to other points at proportionately low rates, of course with the consent of the roads. All the weaker lines are accused, with more than usual emphasis, of cutting rates on grain eastward from Chicago. The Erie and the Baltimore & Ohio Southwestern have been brought before the Trunk Line Association for cutting passenger rates through outside agents at Cincinnati. The Boston & Albany, Vanderbilt lines, Chicago & Northwestern and Union Pacific are reported as having combined to pay \$20 commission on second class tickets to the Pacific coast, the evident purpose being to meet the reductions made by more southerly routes.

### Eastbound Freight Shipments.

The shipments of eastbound freight from Chicago by all the lines for the week ending March 19 amounted to 80,640 tons, against 91,455 tons during the preceding week, a decrease of 10,815 tons, and against 76,302 tons during the corresponding week of 1891, an increase of 4,248 tons. The proportions carried by each road were:

Roads.	W k to Mar. 19.	Week to Mar. 12.
	Tons. P. c.	Tons. P. c.
Michigan Central.....	12,820 15.9	15,135 16.6
Wabash.....	12,065 15.0	11,653 12.7
Lake Shore & Michigan South.....	8,755 10.9	11,853 12.9
Pitta., Ft. Wayne & Chicago.....	8,428 10.4	8,955 9.8
Pitta., Cin., Chicago & St. Louis.....	6,727 8.3	5,511 6.0
Baltimore & Ohio.....	4,831 6.0	6,009 6.6
Chicago & Grand Trunk.....	7,950 9.9	11,310 12.4
New York, Chic. & St. Louis.....	5,053 6.3	7,039 7.7
Chicago & Erie.....	11,571 14.3	10,989 11.9
Other lines.....	2,420 3.0	3,101 3.4
Total.....	80,640 100.0	91,455 100.0

The three Vanderbilt lines together carried 41.1 per cent. while the two Pennsylvania lines carried 18.7 per cent.



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The best results are obtained in freight train braking from having all the cars in a train fitted with power brakes, but several years' experience has proven conclusively that brakes can be successfully and profitably used on freight trains where but a portion of the cars are so equipped. Below is a graphical illustration of the progress made in the application of the Automatic Brake to freight cars since its inception.

Year.	No. per year.		Grand total.
1881	105		105
1882	1,085		1,190
1883	4,966		6,156
1884	15,051		21,207
1885	10,410		31,617
1886	8,946		40,563
1887	9,281		49,844
1888	27,696		77,540
1889	26,065		103,605
1890	50,502		154,107
1891	39,061		193,168

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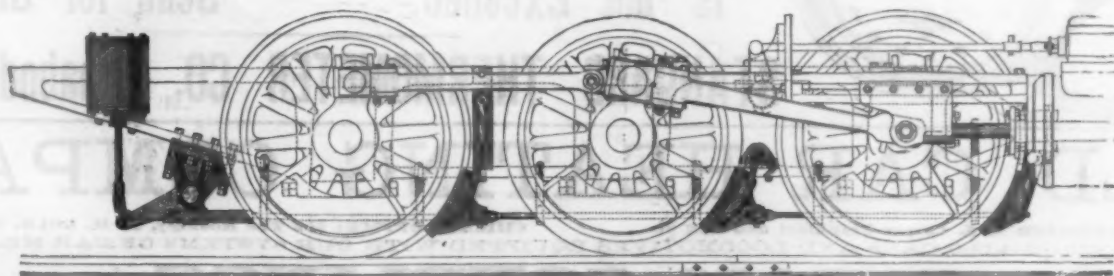
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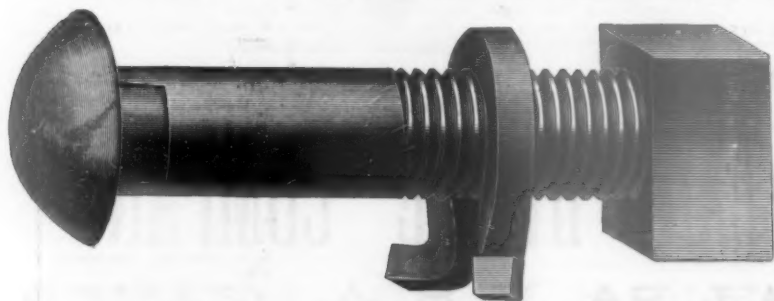
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This nut lock is presented on its merits as the best and cheapest device for securing track joints.

It is a torsional loop made of good quality of tempered spring steel, having horizontally inclined foot pieces, which are curved inward, thereby greatly increasing the spring resistance and acting simultaneously: rests upon the base of angle bar, or underlying rail base in case of fish plate, preventing the loop portion from rotating and hammering down thread of bolt.

The nut lock for  $\frac{1}{4}$  bolt made of  $\frac{1}{4}$  in. square steel, standard pattern, yields a tension of 4,300 lbs. on the bolt, which is sufficient to reduce the wear of the bearing surfaces of the angle bars on the rails, imparting, as it does, a uniform bearing the entire length of the bar.

The "Standard" Nut Lock has sufficient elasticity to maintain a tight joint, which cannot be truthfully said of many light-weight single coil washers.

The "Standard" Nut Lock is, in its superficial form, similar to an annular coil twisted out of plain, i. e., the curved shoulders or ends of the loop proper are spread in the usual manner of spring coils, at which bearing points the locking friction is equal to that of the best single coil washer, and added to this it is terminated in *inwardly curved* extensions, which must apparently furnish additional short leverage spring force of a torsional character.

## Distinctive Merits of the "Standard" Nut Lock, Condensed:

Fixedness of position—cannot rotate and hammer down threads of bolt.  
 Cannot get one end into elongated slot of angle-bar.  
 Unlike any *perma* nutly placed, double washer, the Standard is interchangeable regardless of distance between bolts.  
 Cannot be put on wrong side out, as the outward projection of the foot pieces would prevent the nut being turned up.  
 Has more spring power directly under the nut than any two ordinary coil nut locks.  
 Being fixed in position, it offers double the locking friction of nut locks, which when in their *dead* "set" condition turn back with nut by the vibrative effect of passing train.  
 The "Standard" Nut Lock embodies the old principle of spring power improved by overcoming the objection to the double washer or nut lock, and covering the weak points of the single coil washer.



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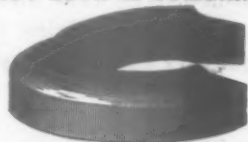


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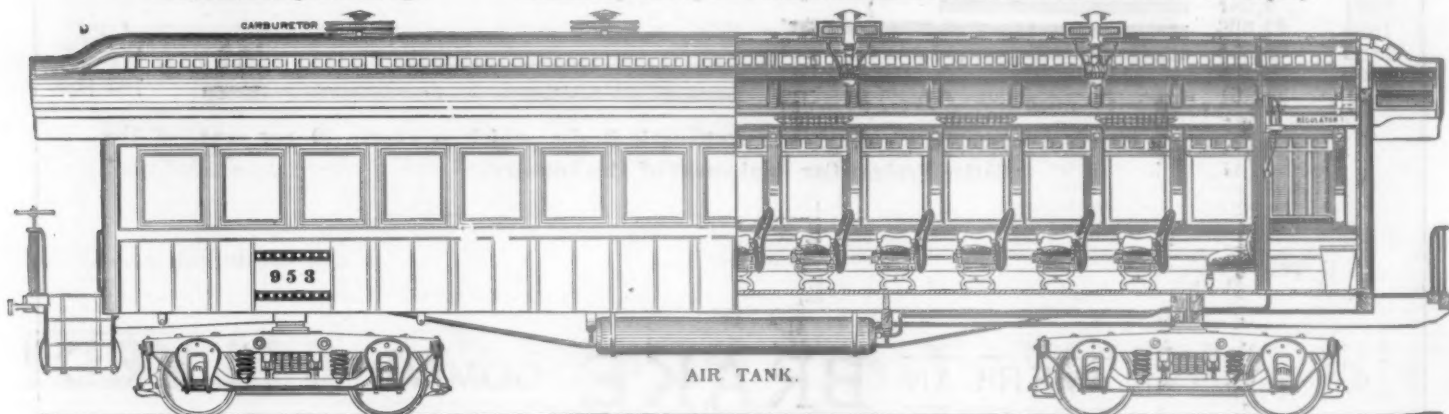
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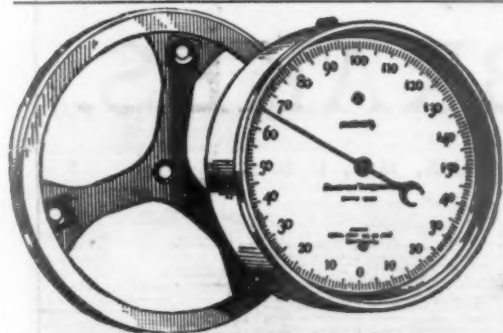


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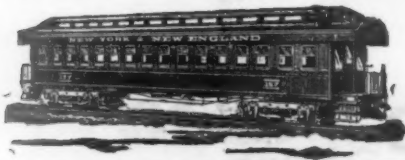
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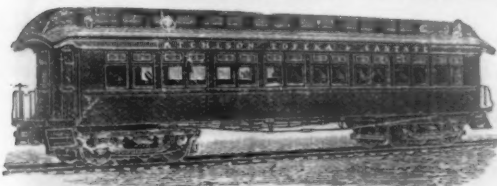
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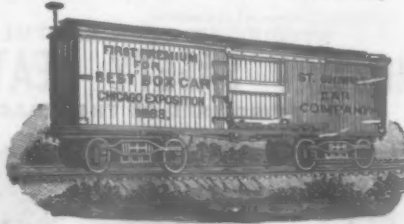
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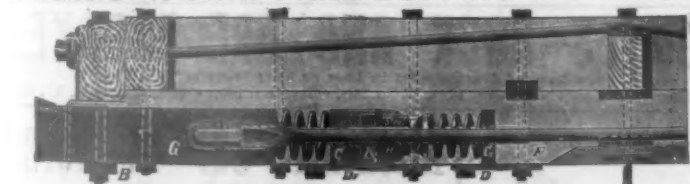
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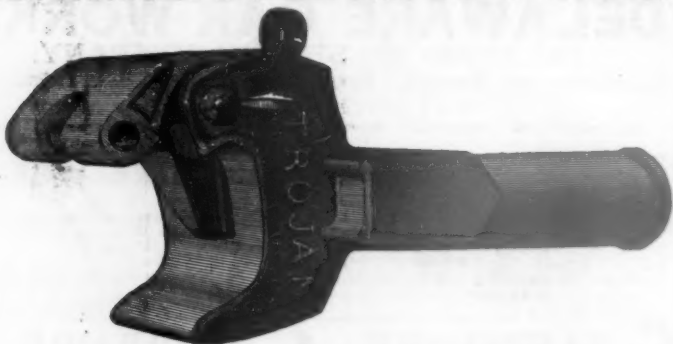
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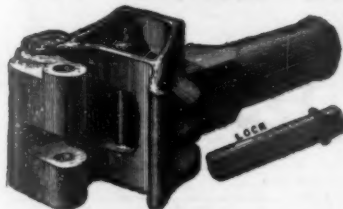
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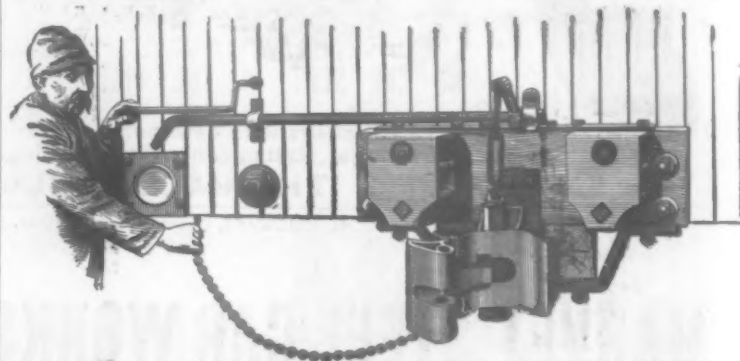
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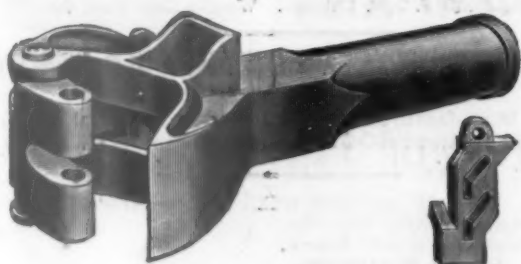
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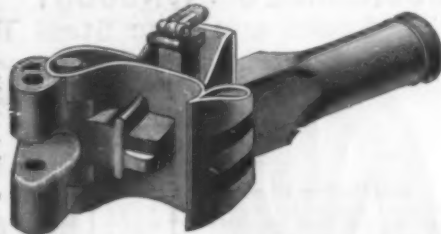
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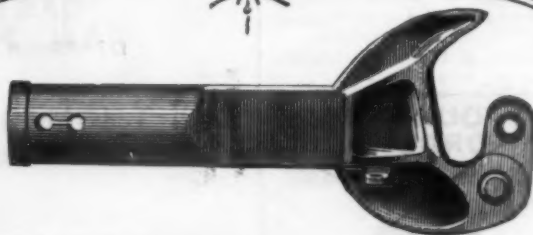
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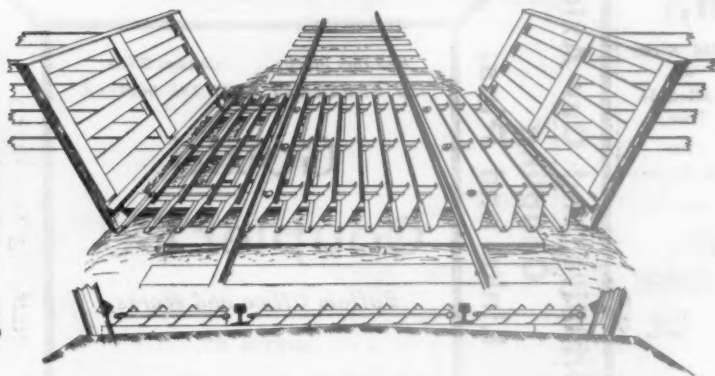
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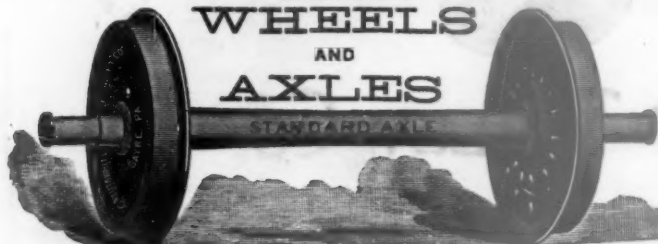
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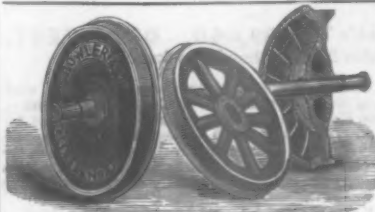
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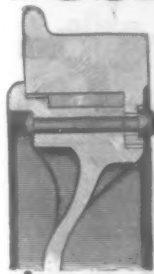
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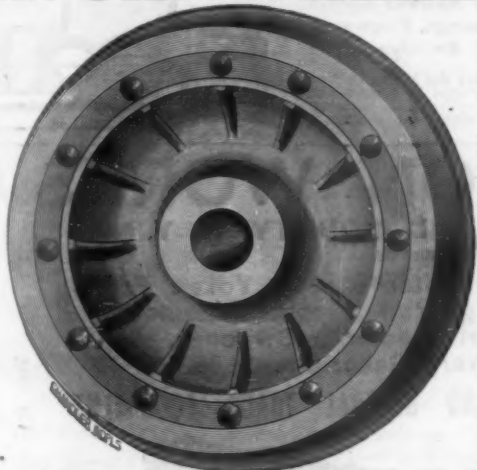
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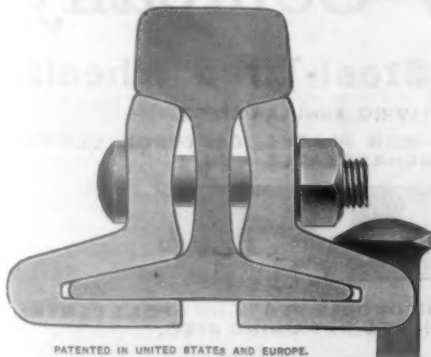
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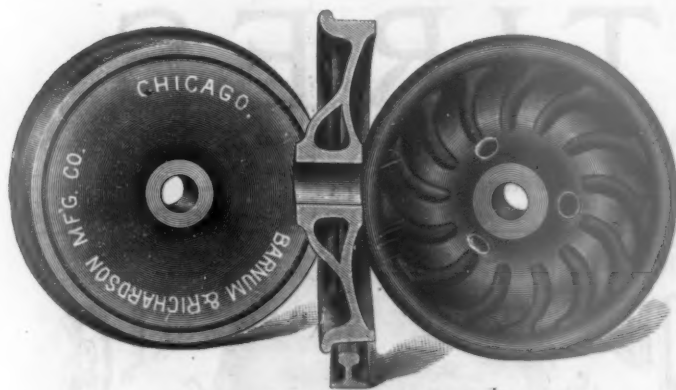
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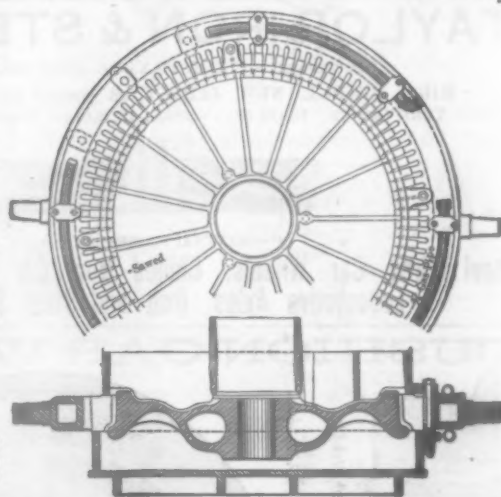
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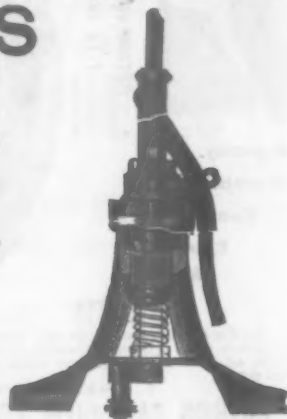
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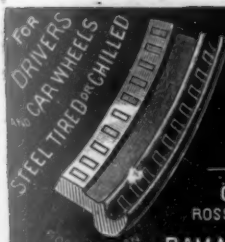
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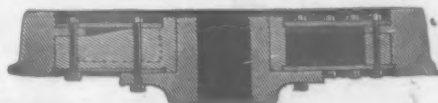
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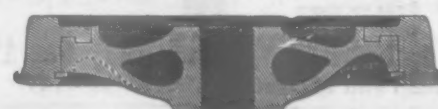
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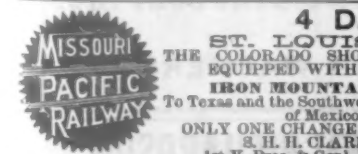
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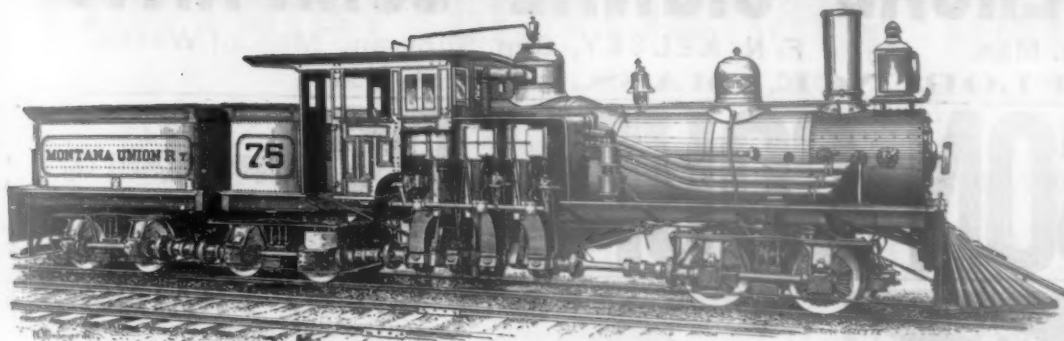
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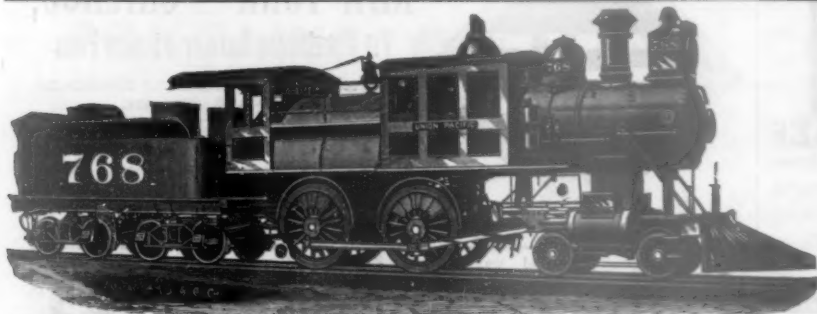
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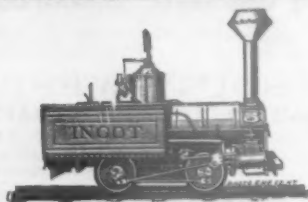
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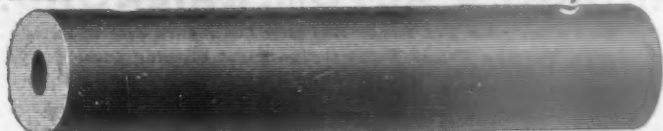
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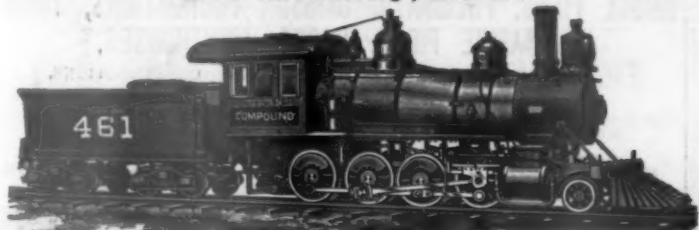
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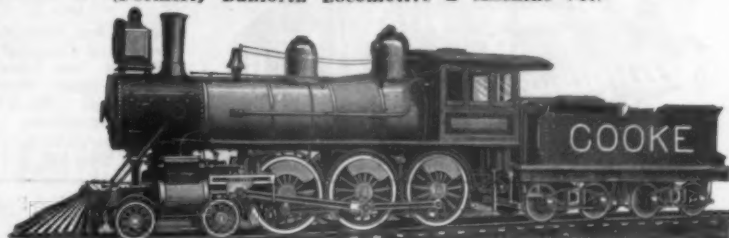
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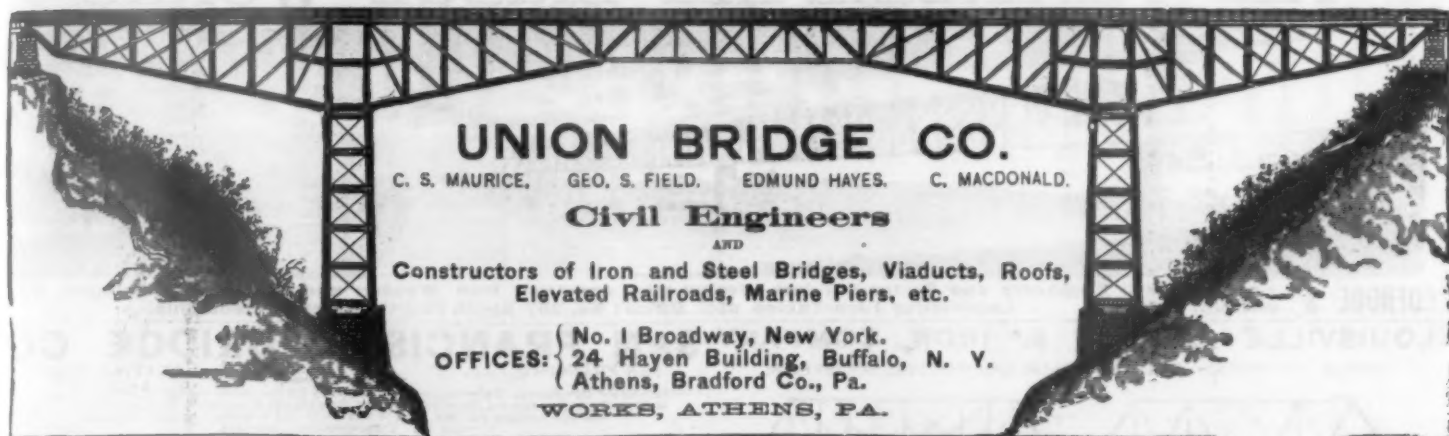
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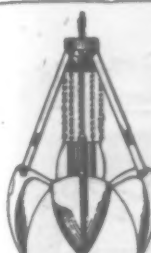
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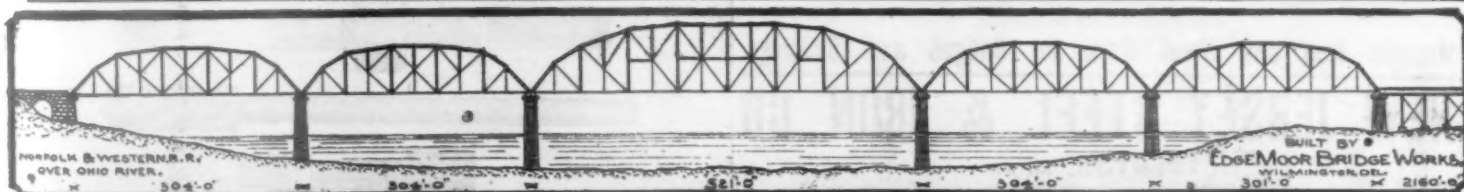
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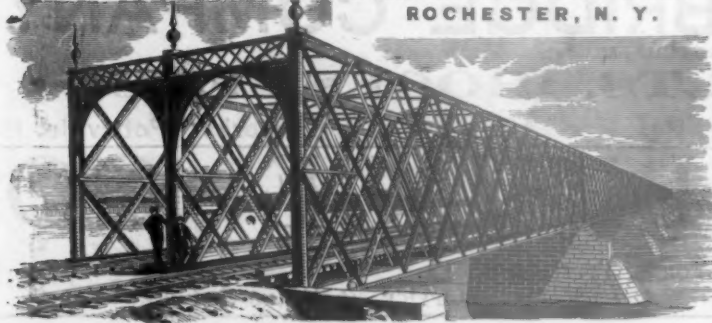
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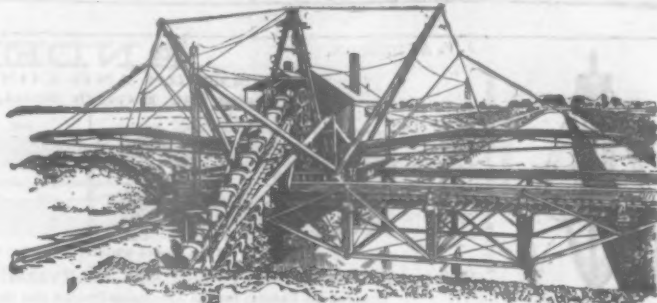
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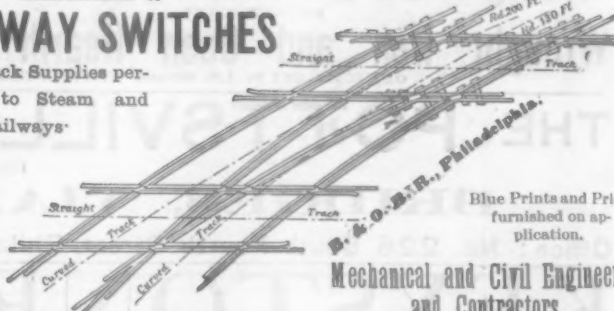
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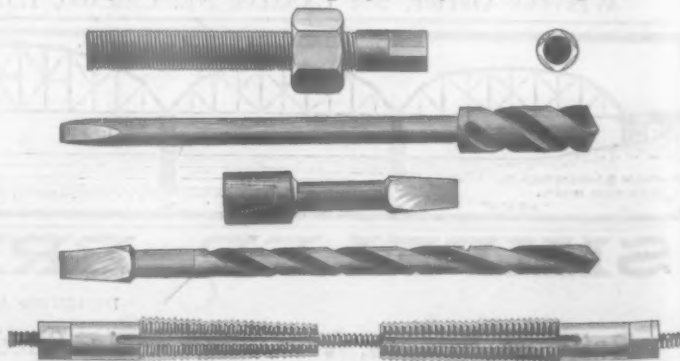


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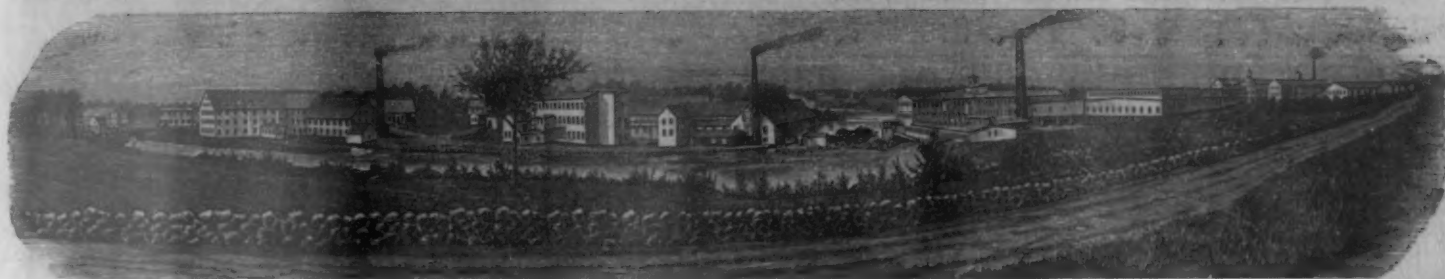
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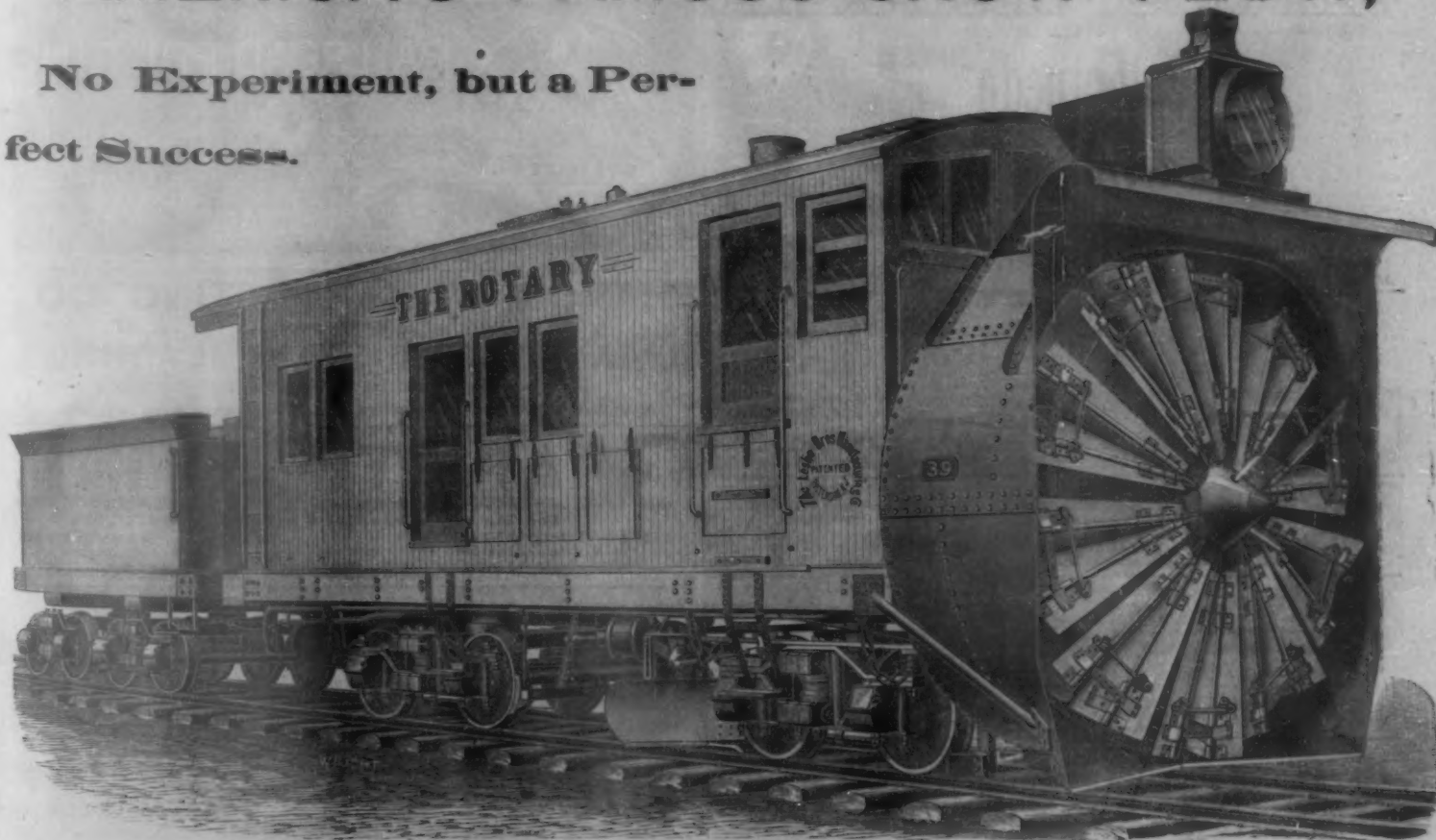
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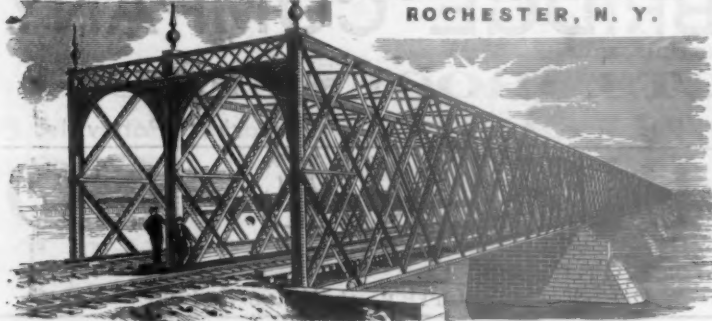
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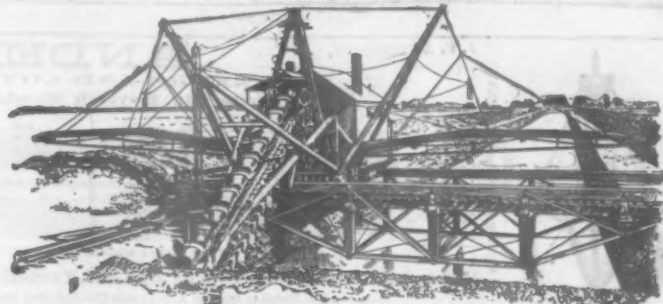
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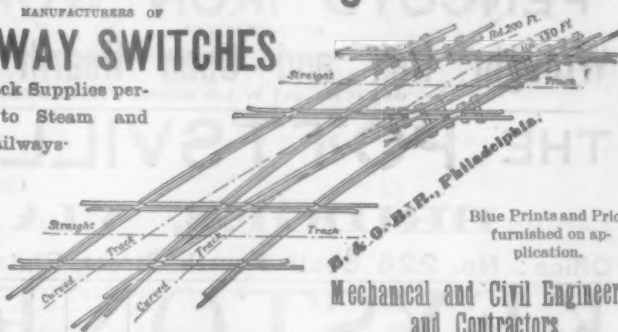
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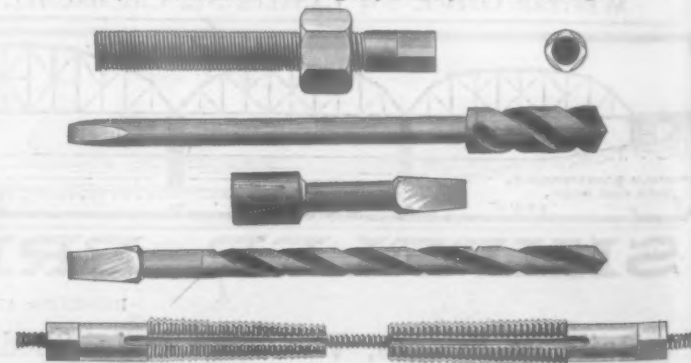


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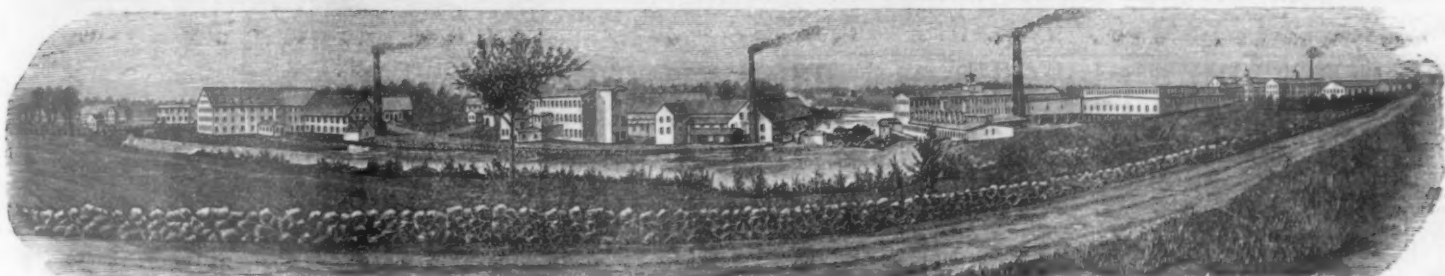
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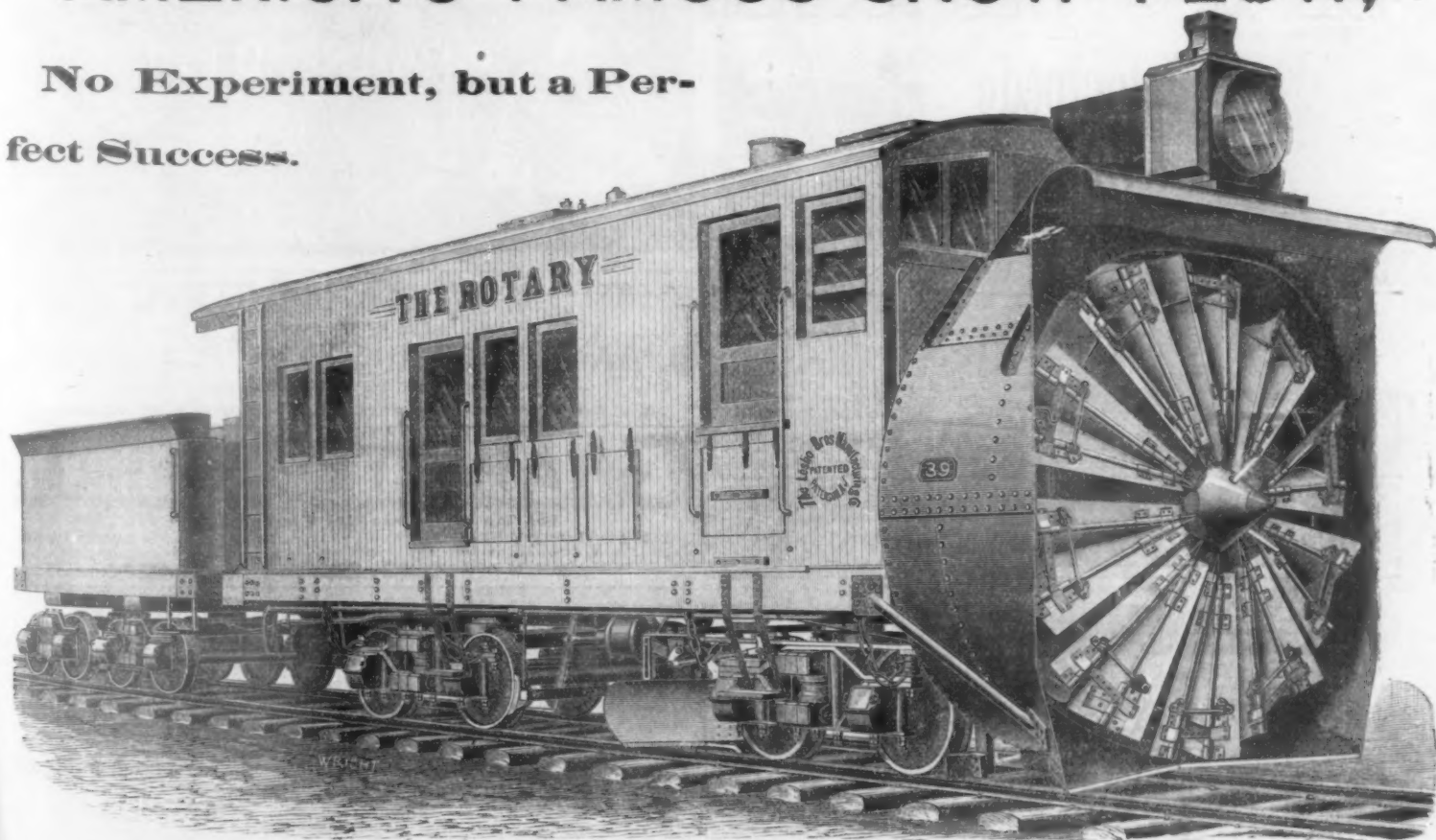
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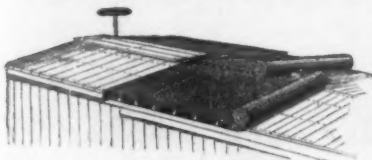


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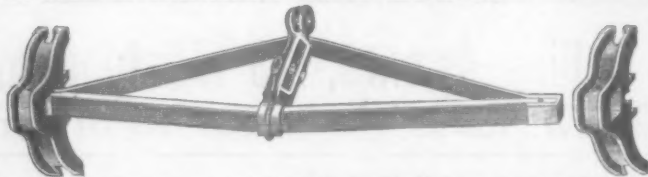
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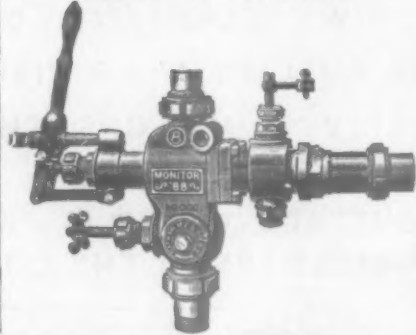
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